Peers, Perceptions of Teaching Practices, and Implications for Student Engagement

by

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Dedication

Dedicated to my family—past, present, and future—whose love and strength inspire me daily.

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Abstract

Given the inherently social context of classrooms, students' beliefs are dependent on the beliefs of their classmates, particularly their classroom friends and popular peers (Ryan & Shin, 2018). I investigated the ways in which students observe and interpret teaching practices in a context of their peers with three studies with the following aims: 1) determine the extent to which classroom friend groups predict changes in student academic engagement and perceptions of teaching practices, 2) determine whether student perceptions of teaching practices are similar to their friends' perceptions. If so, is this similarity related to friends selecting, maintaining, or influencing friends, and 3) determine the extent to which peer descriptive and status norms of perceptions of teaching practices predict changes in individual student perceptions of these practices.

The studies use data from the Classroom and Peer Ecologies (CAPE) Project (PI Allison Ryan), a study of 58 elementary to middle school classrooms in the fall and the spring of the school year. We surveyed students about their perceptions of three autonomy-supportive teaching practices (disciplinary harshness/upholding fairness, promoting student voice and choice, and fostering relevance) and three measures of student engagement (emotional engagement, behavioral engagement, and disruptive behavior) in their math and science class. For 48 classrooms, students indicated which classmates they considered friends and whom they considered "really cool" in the fall and the spring.

Study I highlighted the relatively minimal role that peer groups play in shaping classmates' perceptions of autonomy-supportive teaching practices but demonstrated that different facets of student perceptions of teaching practices relate to peer groups in distinct ways. There was significant variance between peer groups in disruptive behavior. Peer group perceptions of teaching practices did not affect student engagement. Therefore, there is no evidence that teachers need to worry about leveraging the influence of students' friend groups to shape their perception of the climate.

Study II utilized one type of longitudinal social network approach, stochastic actor-based modeling, to understand how changes in friendships from fall to spring coincided with changes in student perceptions of the teaching practices. Different teaching practices in relation to student friendship connections operate in distinct ways. For student perceptions of autonomy support, patterns of peer homophily differed based on observed teacher emotional support.

Study III reinforced the idea that classroom-wide characteristics, particularly peer descriptive norms, matter more than the influence of peers with social status in shaping beliefs.

The findings across the three studies provide evidence that students choose friends with similar perceptions as themselves and do not substantially influence their classmates' perceptions apart from class-wide perceptions.

Chapter 1: Introduction

As adolescents spend most of their waking hours in schools surrounded by teachers and peers, social aspects of the classroom climate—including relationships with teachers and peers—are an especially important context for early adolescent engagement (Patrick, Mantzicopoulos, & Sears, 2012). Academic engagement is the emotional quality and behavioral intensity of a student's active involvement in learning tasks (Reeve et al. 2004). Student engagement in the classroom is a co-constructed process between students, their peers, and the teacher (Nolen, Horn, & Ward, 2015). How students and teachers interact with each other and with the immediate and surrounding environments or climates create the classroom ecology (Barker, 1965; Bronfenbrenner, 1977).

Problem and Significance

Despite decades of awareness that classroom environments shape adolescents' engagement in learning tasks, questions remain about which classroom factors meet students' needs (E.M. Anderman, 2011; L.H. Anderman, Andrzejewski, & Allen, 2011). Research across fields has particularly focused on student perceptions to make conclusions about teaching practices, usually by averaging all student perceptions as a valid indicator of the climate. However, student perceptions do not occur in isolation. Students observe and interpret teacher behavior amidst a classroom of peers, and peers are especially influential during early adolescence.

While most work concentrates on the influence of teachers *or* peers on student academic engagement, there have recently been studies aimed at understanding the joint

influence of teachers and peers on student engagement, examining these socializers in tandem (Vollet, Kindermann, & Skinner, 2017). However, how these two socializers work in conjunction with each other is unknown. Prior work primarily concentrated on how teachers shape students' peer interactions (Farmer et al., 2011; 2018; Hughes, 2012; McKellar et al., in press). While teachers shape students, there is growing evidence about how peers influence one another (see Kinderman, 2016).

According to social-cognitive theory (Bandura, 2001), students perceive their environment in line with how they view themselves in relation to others, especially their peers. Given the inherently social context of classrooms, there is an interdependence of students' beliefs with their classmates, particularly their classroom friends or classmates with social status (Ryan, Kuusinen, & Bedoya-Skoog, 2015). To date, no work investigates the extent to which peer social dynamics are related to similarities in how students perceive teaching practices.

The overarching aim of my dissertation is to understand the extent to which classroom peers' beliefs shape their classmates' perceptions and engagement. I focus specifically on the role of peers' perceptions of autonomy-supportive teaching practices and engagement. The extent to which students share the perceptions of classmates considered friends supports a greater understanding of students' beliefs about the classroom environment, especially autonomy-enhancing teaching practices (i.e., disciplinary harshness/upholding fairness, promoting voice and choice, and fostering relevance).

Chapter 2: Literature Review

Adolescents spend most of their waking hours in classrooms, and these contexts play a crucial role in shaping academic engagement, motivation, and achievement. While students have little control over much of the school context, student friendship ties are among the areas through which they have choices. Students also look to the friends they choose to gain information within the classroom. While much research has looked at peer influence effects on academic engagement, motivation, and achievement (Altermatt & Pomerantz, 2003; Kindermann, 2007; Ryan, 2001), few studies have examined peer effects on precursors to those outcomes, such as student perception of classroom teachers.

Literature accumulated across decades suggests that autonomy-supportive classroom climates motivate and engage students in learning (Ames, 1992; Deci & Ryan, 2000; Ryan & Deci, 2000; 2002; 2016; Maehr & Midgley, 1991). Yet the notion of a single "classroom climate" has largely been dispelled, and prior work has focused on individual differences—rather than peer or friend groups—as the mechanism to explain different perceptions (Shukla et al. 2016; Weinstein, 2002; Woolfolk Hoy & Weinstein, 2014).

Student perceptions of teachers are subjective and vary widely within classrooms (Ruzek & Schenke, 2018). Given this, there have been calls for understanding the mechanisms behind differences in perceptions of the classroom climate (Schenke, 2018; Schweig, 2016; Wallace, 2016). These differences may be related to different characteristics of students that are linked to individuals or friend groups. For instance,

students who are behaviorally engaged and on-task may garner more trust and freedom from teachers, or they may finish required tasks to afford them more time to choose how to spend the remainder of class time. Within the same classroom, there may be a group of friends who keep each other off task, and thus, the teacher may act in a more controlling way in response to this peer group and offer them a qualitatively distinct learning environment. Each of the three studies that comprise this dissertation investigated the role of individuals, peers, and class-wide perceptions of autonomy-supportive climates, and one study explored the extent to which student perceptions of autonomy predict student engagement within classrooms.

Classroom Motivational Climate: Autonomy-Support

Teaching practices have largely been the defining characteristics of the motivational climate that students perceive, namely whether there are practices that show regard for student perspectives (Deci & Ryan, 2000) and environments that focus on supporting student learning and growth (Ames, 1992; Patrick, Skinner, & Connell, 1993). Students are more likely to engage in classroom activities when they feel their teachers give them a say in how they learn, cater instruction to their needs, and respond fairly when students are off-tasks or make mistakes (Jang, 2010; Ruzek et al. 2016; Wang, 2017; Fredricks et al. 2019b). These teaching practices fall on a continuum ranging from highly autonomy-supportive to highly controlling, according to self-determination theory (Deci & Ryan, 2000; Ryan & Deci, 2000; 2002; 2016). As the basis for my dissertation, I focused on three autonomy-supportive practices that Assor, Kaplan, and Roth's (2002) research linked to student engagement: upholding fairness (or low disciplinary harshness), promoting voice and choices, and fostering relevance.

First, when teaching practices enhance students' autonomy during learning activities, students take the initiative by making choices, taking on challenges, and engaging with their curiosity, rather than relying on external sources of motivation such as incentives, consequences, directives, and deadlines. Stefanou and colleagues (2014) documented the following as an example of what these teaching practices look like when observing a participant teacher, Ms. Benjamin, communicating with students during instruction, encouraging student agency in the following guide instruction:

> *"Who can tell me—here's another way; I don't know, maybe one of you approached it like this—how can I change this to a decimal and then transfer from decimal to a percentage? This might be the way I would approach it. Who can change this (5/8) to a decimal? How would you do it? Think about that for a minute because we can use these for our advantage. If we know how to do one, we can convert to another… There are many, many ways that you can get these conversions… as long as you're thinking through in a mathematical strategy that is correct, you're going to come up with the right answer."* (p. 104)

Second, autonomy-supportive teaching practices use what is relevant and accessible to students as part of instruction. These practices involve considering and communicating the value of the students' perspectives during learning activities, inquiring about and acknowledging students' feelings, and accepting students' expressions of negative affect as a potentially strong reaction to classroom demands, imposed structures, and the presentation of uninteresting or devalued activities. Reeves

and colleagues (1999) documented the following teacher's ability to foster understanding and interest—or relevance—as a means of supporting autonomy:

> *"I talked to the student individually in a neutral setting before school. I checked his schedule to see if my preparation time matched with a study hall. I went over the material with the student—he had difficulty reading. He wasn't as disinterested as he appeared—he didn't understand the material. I hoped to interest the student in the subject matter."* (p. 545)

Finally, teachers who adopt autonomy-supportive practices are also fair and do not need to be harsh with students. Autonomy-supportive practices are non-controlling, involve explanatory rationales for requested tasks, and allow flexibility in how students complete tasks. In contrast, when teachers are autonomy-controlling, they neglect to explain classroom processes, fail to support student choice, and use harshly evaluative messages (e.g., controlling, pressuring, or even rigidly coercive language). Reeves and colleagues (1999) outlined an example of when teachers did not need disciplinary harshness to manage behavior and used fairness and autonomy-support:

> *"During class discussion, when the student was talking to an excess, I did in a matter-of-fact tone say that, "F., that conversation is not acceptable at this time." Later, when we had a break before recess, talked to F. about what is acceptable conversation in the class, and also how his talking is not showing respect for his classmates. I tried to help F. see that by disrupting the class, he is not showing respect."* (p. 545)

All three of these constructs warrant investigation as they differentially relate to student engagement outcomes and views of positive climates. Of the different practices

that Assor et al. (2002) examined, teachers "fostering relevance" and "suppressing criticism" were found to be most strongly associated with behavioral and cognitive engagement. And providing students with voice and choice was also found to predict engagement. For my dissertation, I pursue three overarching studies on how peer processes relate to student perceptions of these autonomy-enhancing teaching practices (i.e., teachers providing meaningful choices, teachers fostering relevance, and teachers employing disciplinary harshness—versus fair management practices).

Student Engagement

Engagement is the emotional quality and behavioral intensity of a student's active involvement in classwork (Connell and Wellborn, 1991; Fredricks, Blumenfeld, & Paris, 2004; Skinner, Furrer, Marchand, & Kindermann, 2008). In contrast, disengagement is often the absence of engagement, yet manifested in disruptive behavior, withdrawing from school activities, and even delinquency (Fredricks et al. 2019b; Wang & Fredricks, 2014). Starting in late elementary school and continuing through secondary school, student engagement declines for many students (Benner & Graham, 2009; Wigfield et al., 2015).

Furthermore, over the past few decades, student engagement and disengagement have received increasing attention because they robustly predict numerous student outcomes (Eccles, 2016; Finn & Zimmer, 2012). In classrooms, academic engagement is especially important because it is a conduit to students' increased motivation, and subsequent learning (Connell & Wellborn, 1991; Finn & Rock, 1997; Skinner & Belmont, 1993). Given this, student engagement is deemed crucial for positive academic adjustment, particularly during early adolescence (Lawson & Lawson, 2013). Early

adolescent engagement predicts academic achievement and attainment (Blondal & Arnardottir, 2012; Chase, Warren, & Lerner, 2015; Finn & Zimmer, 2012; Reyes, Brackett, Rivers, White, and Salovey, 2014). Engagement in schoolwork is also associated with increased academic retention, the likelihood of graduation, and declines in delinquency (Fall & Roberts, 2012; Li & Lerner, 2011; Wang & Fredricks, 2014; Wang & Peck, 2013). Student engagement is viewed as a multifaceted construct most often assessed by asking students about what they do, think, and/or feel concerning academic tasks (Eccles, 2016).

Student engagement must be conceptually and empirically defined to appropriately investigate the links between student perceptions of autonomy-supportive teaching practices in relation to engagement. Several conceptualizations of engagement have been outlined in the literature, including academic, agentic, affective, social, and cognitive engagement (Jimerson, Campos, & Greif, 2003; Reschly & Christenson, 2012). While this specificity may lend itself to more accurate predictions of outcome measures depending on the study, Eccles (2016) cautions that researchers may lose sight of engagement as a more holistic concept. One of the most promising newer frameworks delineates between three types of engagement: behavioral, emotional, and cognitive. While this model addresses Eccle's concerns about parsimony, the items used for cognitive engagement overlap with items assessing self-regulation. For example, cognitive engagement is defined as a "self-regulated approach to learning and use of metacognitive strategies" (Wang & Eccles 2012, p. 31). Wang and Eccles also use self-regulation items as their measure for cognitive engagement (e.g., "How often do you try to relate what you are studying to other things you know about?", "How often do you try

to plan what you have to do for homework before you get started?"). Similarly, Quinn's (2017) study of cognitive engagement uses self-regulation items (e.g., ''If I don't understand what I read; I go back and read over it again''). However, Quinn (2017) does not connect cognitive engagement to self-regulation, despite the similarity in items. This issue of the creation of a plethora of items or constructs measuring similar phenomena has been referred to as the jingle-jangle fallacy, which engagement researchers have pointed to as a possible concern (Reschly & Christenson, 2012).

Given the established literature in self-regulation, focusing on emotional and behavior engagement may be a promising way to approach the present study. Therefore, we adopted Finn's (1989) parsimonious two-dimensional approach to understanding engagement and its antecedents. According to Finn's participation-identification model, students who engage in learning participate in actions that align with their investment and become emotionally invested in these actions (Finn, 1989). Behavioral engagement refers to a student's active engagement, e.g., a student pays attention, participates, listens, and is involved in classroom activities. In contrast, emotional engagement refers to the internal state, e.g., a student is interested, having fun, and enjoying class activities. While both facets of engagement tend to be associated with the same student outcomes, they may differ in how they respond to the learning context. In Finn's model, behavioral engagement and emotional engagement are reciprocal, as active participation results in the student beginning to enjoy and identify with learning tasks. Building on Finn's model, Skinner, Kindermann, and Furrer (2009) also stressed the importance of measuring disengagement. They established that disengagement is theoretically and empirically distinct low engagement, since students may participate in their work but act

out or remain bored, which behavior and emotional items do not appropriately capture (Fredricks et al. 2019).

Although there is a wealth of research on links between student perceptions of autonomy-support with student engagement (Reeves et al. 2004; Hospel & Garland, 2016; Wang et al. 2017a; Matos et al. 2018; Patall, 2018), much less is known about the role of peers in how students experience teaching practices. Students do not perceive their teachers' behaviors in a vacuum, and it is critical to understand how peers may be implicated in how students experience autonomy-support within the classroom.

Variance in Student Perceptions of Teaching Practices

Social-ecological theories highlight the importance of student perceptions of their learning climate, opposed to others' perceptions (e.g., teacher ratings or those considered "objective" measure like external observers reports), as critical for understanding behavior (Bronfenbrenner, 1977; Kuperminc, Leadbeater, & Blatt, 2002; Kuperminc et al., 1997; Spencer et al. 2015). Murray's (1938) need-press theory outlines how misaligned needs (or lack of support for differences in disposition) and press (environmental influences on individual motivation that are linked with individual's needs) creates disequilibrium on which individuals respond and act. This theory, stressing the importance of individual student's unique perceptions and needs, eventually informed Deci and Ryan's (2000) self-determination theory and their support for autonomy-supportive teaching practices.

Furthermore, motivational researchers have long acknowledged that students' beliefs about their classroom climates reflect something absolute about the classroom environment (e.g., the efficacy of teaching practices) and something relative about the

classroom (e.g., unique to students' background and/or individual students interactions with the teacher; Ames, 1992; Lewin, 1936; Maehr & Midgley, 1991). Yet motivation in education researchers increased the study of these phenomena with the advances and greater ease from multilevel modeling in the 1980s and 1990s. Multilevel modeling has allowed researchers to parse the variance of student reports of the climate within classrooms and the variance between classrooms (or schools). Analysts can now examine both the individual as the unit of analysis and aggregated data at the classroom level to examine the variance at each level (e.g., Raudenbush & Bryk, 2002). The use of multiple "levels'' (e.g., school, classroom teachers, and student) is central to research on educational climate (e.g., school/teacher effectiveness studies, value-added models, classroom/school climate).

However, recent reviews of classroom climate research (e.g., Lau & Nie, 2008; Marsh et al., 2012; Miller & Murdock, 2007; Papaioannou, Marsh, & Theodorakis, 2004) have pointed to a persistent failure to consider the appropriate level of analysis and the absence of proper control for measurement and sampling error. These researchers argue that student reports of teaching practices should be analyzed solely at the classroom; otherwise, results are vulnerable to systematic biases (e.g., Morin et al., 2014; Marsh et al., 2012; Marsh et al., 2009, 2012; Papaioannou et al., 2004; for further discussion of these biases, see Miller & Murdock, 2007). Marsh and colleagues (2012) claimed that residual Level 1 climate ratings have no substantive meaning concerning the interpretation of the Level 2 climate effects and only need to be in the model to properly control for unreliability and sampling error in the aggregation of individual ratings into Level 2 constructs. Morin et al. (2014) built upon this work to argue that a lack of

consensus in student reports of their classroom "should not be considered further as a measure of classroom climate" (p. 147).

Wallace (2016) and Schweig (2016) explicitly assert that differences within the classroom consensus or dispersion provide useful information about effective teaching practices related to distinct student needs. The extent to which within-classroom variation may provide useful information about the classroom overall or the individual classroom interactions has been gaining traction in recent years (Wallace, 2016; Schweig, 2016; Schenke, 2018). Individual student differences, distinct teacher interactions, and peer influence are all possible factors that contribute to sub-climates or variance in perceptions of climate.

Similarly, Lindell and Brandt (2000) assert that, rather than eliminating classrooms from further analysis due to lack of consensus or dispersion,

> *"...the researcher should search for the basis of the differences between the two subgroups. Is it based on different departments, organizational levels, or other structural characteristics? Or is it based on personal characteristics such as experience, ability, or personality?"* (p. 336).

Multilevel methods have allowed researchers to assess student-varying beliefs about teaching practices within and between classrooms. For example, boys and ethnic minority students tend to report less favorable perceptions of school climate (Koth, Bradshaw, & Leaf, 2008; La Salle et al. 2018; Kuperminc et al., 1997) and classroom climate (Day et al. 2013). However, the individual differences within classrooms may also be more pronounced in some classrooms than others, and the same for schools (Schweig, 2016). In a cross-sectional study by La Salle et al. (2018), individual students

with greater achievement (i.e., higher College and Career Readiness Performance Index scores) reported a less positive climate, which La Salle and colleagues noted as surprising, yet the effect overall was small and most pronounced in males. Overall, there is ample evidence to support that student perceptions of classroom and climate are influenced by individual factors, such as gender, grade, race/ethnicity, and achievement, yet the strength of these associations varies by classrooms and schools (Brookover et al., 1978; Koth et al. 2008; Wilson, Rodkin, & Ryan, 2014; Wilson & Jamison, 2019). While student race, ethnicity, and gender are often attributed to individual characteristics, these traits can also be viewed as group memberships. Students select friends with similar traits, and these traits hold implications for student outcomes. Kiuru et al. (2008) and colleagues' found peer groups were almost homogeneous by student gender, with 96% of the variation of individual student perceptions explained by peer group level. They noted, "Consequently, gender can be considered mainly as a peer group level predictor" (p. 41).

Moreover, Hamm and colleagues' (2011) study of friend groups revealed significant peer group variability in their unconditional models for student perceptions of classroom climate and their academic outcomes. However, the addition of student-level control variables, namely prior reports of the outcome variables (i.e., a greater sense of school belongingness, lower sense of emotional risk of school context, more likely to report protecting peers from bullying, and less likely to report encouraging bullying), eliminated significant residual variance at the friend group level. They stated this was likely "due to student self-selection into peer groups in which students share similar dispositions toward school and peers (see Hamm & Faircloth, 2005)" (p. 272). Given this, Hamm et al. decided not to use nested analyses because the group level variance was

explained by the individual characteristics. The use of only individual-level student reports is an example of a methodology that Morin et al. (2014) and Marsh et al. (2012) oppose. From the work on peer groups within classrooms, overlap between individual, friend groups, and all students within-classroom perceptions of climate or teaching practices merits further – namely simultaneous – investigation.

A few studies have outlined the potential of sub-climates based on the share perceptions of subgroups within broader organizations (Schneider, Salvaggio, & Subirats, 2002; Lindell & Brandt, 2000; Frank, 1995), but Deer Maxwell, and Relich (1986) and Greiner et al. (1968), were the only studies we could find that explicitly found differing perceptions of students within classrooms as sub-climates. However, these studies did not employ methods to parse out differences in between-classroom variance in contrast to within-classroom variance of perceptions. Other studies focus more on understanding subgroup differences or idiosyncratic perceptions of climate related to within-classroom differences of gender (Crosnoe et al., 2008), race (Schenke et al. 2017), or achievement (Schenke, 2018) groups.

Furthermore, there is promising work on the importance of friend groups and subgroups of students within schools and classrooms (see Frank & Zhao, 2005 for review). For example, Day et al., (2013) assessed individual student and peer group sense of belongingness and showed that students are similar to their peers in their perception of school climate (i.e., sense of belongingness). They noticed that students integrated more with peers when they perceived being accepted and had a greater sense of belongingness in their classroom. While they measured these traits at the individual level, Day et al. outlined evidence that aspects of student social connectedness at the individual and peer

group levels supported more favorable perceptions of school climate (e.g., belongingness) across the transition. While this provides some evidence related to the importance of peers for perceptions of climate, Day and colleagues work focused on the climate indicator of peer belongingness. Might peer groups be linked with student perceptions of climate in other ways? To date, no study has explored the concept of sub-climates of autonomy-support teaching practices within a classroom based on peer groups or cliques

Additionally, understanding peer perceptions as they relate to learning climates is a promising area to explore, given that teachers feel the least efficacious in managing peer dynamics compared to other practices (Ryan et al., 2015). This management, or lack thereof, might explain how peers shape the climate (Farmer et al., 2011; 2018; Rodkin & Ryan, 2012; Ryan & Shin, 2018).

Student Peer Social Dynamics and Influential Classmates

During adolescence, cognitive skills such as perspective taking (Blakemore & Choudhury, 2006) and time spent with peers can increase the extent to which students adhere to the social norms of their friend group (Ryan, 2001; Wang et al., 2018b). Classroom peer social dynamics refer to how students form relationships, interact with each other, and influence one another (Kindermann, 1996; Ryan, 2001).

Decades of research established that friends within the same group are similar in their outcomes, including academic achievement, burnout, learning motivation, and engagement (e.g., Chen et al., 2003; Kindermann et al., 1996; Kiuru et al. 2008; Ryan, 2001; see Kinderman, 2016 for review). A growing area of interest among peer researchers is how peers form and maintain friend groups and the role they play in

academic outcomes or actions (Snijders et al., 2010). The similarity to one's friend group has been linked to positive outcomes, and perceptions of the classroom climate are linked to positive outcomes. Similarity among friends in how they view the classroom climate has yet to be explored.

There is evidence of how youth form friend groups and develop roles and reputation, through which social behavior is elicited, established, supported, and adjusted. This process is called social synchrony (Cairns, 1979). Do peers hold a kind of monopoly on norms of perceiving or interacting with teachers? If not across all classrooms, are there patterns when accounting for classroom-level effects? Overall, there is ample evidence for the role that peers play outside of the classroom and on behaviors more generally, especially when it comes to negative behaviors. In short, how do friends affect how a student experiences the classroom climate?

Interpersonal attraction theory posits that students form friendships based on similar physical and dispositional attributes (Byrne & Griffitt, 1976). Friends share information and motivate and encourage each other for school involvement (Crosnoe et al., 2003). While perceptions of autonomy-supportive practices and peer group affiliation relate to positive academic engagement (Ruzek et al. 2016; Hein & Jõesaar, 2015; Soenens & Vansteenkiste, 2005; Van Ryzin et al., 2009; Christenson et al. 2012; Vollet, et al. 2017), there are no studies on the extent to which classmate "influencers" operate independently or play an overlapping role in engaging student outcomes during early adolescence.

Our understanding of peers' role in adolescent development has grown, especially regarding peer dynamics in relation to learning outcomes (Ryan & Shin, 2018). This

literature surge has revealed how multifaceted the role of peers is in students' lives and sheds light on the complexity of these relationships (see Kinderman, 2016; Ryan & Shin, 2018 for reviews). Who are influential peers? Within school settings, there are several types of influential peers (e.g., friends, popular students, bullies, classmates, crushes), and these different types of influential peers often overlap (Kinderman, 2016; Ryan, 2000). Student friendships are among the most widely studied category of influential peers (e.g., Berndt & Murphy, 2003; Berndt, 2004). Friendships are "intimate relationships between partners who help each other, like each other, enjoy being together, share details about their private lives and their views about the world, and value each other" (Kinderman, 2016, p. 34). In addition to friends, another widely studied area of peer dynamics is the influence of peers with higher social status— or preference as social partners (i.e., accepted, disliked, or neither, e.g., Morano, 1934), or popularity (i.e., cool or admired; van den Berg et al., 2017). For the current study, I focus on understanding the extent to which friends and peers nominated as "really cool" relate to individual student perceptions of teaching practices of autonomy support.

Overview of Dissertation

My dissertation investigated how teacher-student and peer dynamics relate to one another and, in turn, predict changes in student engagement over time. I explored three approaches to understanding the role of peers in perceptions of the teaching practices. I also examined the extent to which friend group perceptions were linked to engagement. First, I examined the role of peer classroom friend groups based on "cliques" formed from friendship nominations. Second, I investigated how these individual friendship nominations evolve in relation to their beliefs about the classroom and engagement.

Finally, I explored "cool norms"—perceptions correlated with coolness class-wide, and explore "descriptive norms"—average classroom-wide perceptions.

In line with the majority of prior research studies, we employed a combination of multilevel and social network approaches using nominations of classroom friends (e.g., Borgatti & Everett, 2008; Borgatti, Mehra, Brass, & Labianca, 2009); and nominations of classroom peers considered "cool." Adolescents' behavior is strongly influenced by the social structure in which they are embedded (Hollingshead, 1949). Social network analysis and multilevel modeling supports a greater understanding of how students develop their perception of teaching practices in the context of their peers (Borgatti et al., 2009). Social network analysis also goes beyond dyadic friendship patterns. It considers all relationships, including indirect and complementary peer connections within the entire social network system such as a school class (e.g., Veenstra et al., 2017). Within network approaches, it is important to underscore the limitations and strengths of cross-section and longitudinal approaches in social network analyses. Multilevel modeling lends itself to nesting links between individual beliefs and behaviors within a certain context, while also understanding variance within and between groups of friends and groups of students in classrooms. Instead of reviewing in depth the growing research on assessing influential peers, we review our methodological approaches that apply to the current dissertation studies: network approaches, multilevel modeling, and correlates of social status. The studies in my dissertation use a combination of these approaches.

Study 1: Peer Groups Via Social Network and Multilevel Models. The first study of my dissertation used a combination of multilevel modeling and social network approaches to understand how peer group membership or characteristics of a peer group

may be linked to student outcomes. I specifically examined the role classroom friend groups play in student perceptions of teacher autonomy-support using three-level models. The three levels used across models consist of students as level 1, friend groups (cliques) as level 2, and classroom as level 3, a strategy introduced to the peer literature by Chen, Chang, Liu, and He (2008) and Ryan (2001). I also investigated whether external observers' ratings of teacher emotional support weakened the extent to which friends influence one another's perceptions. This assumed that teachers with emotionally supportive practices are more likely to create classrooms with less cliqued peer groups or greater overall cohesiveness. In this case, the teacher is a welcome leader of the classroom community, which may override the influence of friend groups on classroom perceptions.

Thus, one can use social network analyses to separate the effects with respect to the analytic level where they occur: 1) the individual level with factors associated with each person; 2) the friend group level; and 3) the classroom or school context (Raudenbush & Bryk, 2002). Adolescents on the individual level are not completely independent from one another, and multilevel modeling allowed us to consider their affiliation to one peer group network and one classroom. A benefit of this approach is that there are usually large mean differences between groups, distinguishing a group level of analysis from an individual level. Peer influence effects can be estimated separately for different groups, even when individuals serve as their controls over time. However, traditional hierarchical linear modeling approaches work only with non-overlapping groups (individuals are in only one group). This might not be accurate in some cases when students are associated with two or more distinguishable cliques.

For Step one, I utilized an algorithm in a program called KliqueFinder to determine students' friend groups within classrooms. Step two explored the extent to which classrooms, cliques, and individuals account for the variance in student perceptions of autonomy-support and in student engagement. I compared this variance decomposition with models without considering cliques—which is the traditional way of understanding the "climate" based on student perceptions of autonomy-support. The third and final step for this process was to assess whether peer group perceptions predict student engagement outcomes.

The tenet of the underlying model was that changes in the individual themselves develop through social interactions with the teachers and classmates but are specifically influenced by average levels of the members of the significant peer group. Each adolescent was part of their peer group or "sphere" of influence, through which they have frequent interaction partners, while other classmates have little influence because the interaction with them is limited. Independent friend groups were a parsimonious way to understand peer influence, but the simplicity and clarity of this approach comes as at a cost; classrooms may have had dense and cohesive ties that make separating friend groups from one another a difficult task. By only allowing for a student to be in one group, that students' influence on other groups is not accounted for.

Study 2: Coevolution of Friendship Networks. Study 2 investigated how the formation or dissolving of friendship ties related to changes in the perception of autonomy-supportive teaching practices. We used longitudinal network analysis to understand these patterns over time.

For longitudinal social network analysis, researchers need at least two waves that assess the social network of individuals within the same network boundary. Dynamic longitudinal analyses are growing with stochastic actor-based modeling (SABM) as the core method. SAMB can be used to study different types of interdependencies within the network, including friendship ties (Snijders, van de Bunt, & Steglich 2010), cooperative ties (Lomi, Snijders, Steglich, & Torló, 2011; Snijders & Lomi, 2019), or conflictual ties (Huitsing et al., 2012). The core modeling process for SAMB is implemented in the Simulation Investigation for Empirical Network Analysis (SIENA), using R software called RSiena (Ripley et al., 2013; 2020). Rsiena and SABM allowed us to look at the change or evolution of student friendships from fall to spring at the same time we looked at evolution of student perceptions of teaching practices—this is called coevolution. This coevolution of friendship network ties and student beliefs using SABM can also account for all the characteristics of students' social networks and additional individual characteristics over time. SABM ultimately "disentangles" friendship selection and friendship influence processes controlling for structural network effects (Snijders et al., 2010). The core benefit of this approach, in contrast with understanding variance in friend group perception, is that students do not have to belong to one peer group, as is rarely the case for within-classroom cliques. Students often listen to members of several groups, especially in classrooms where there is a great deal of overlap in friendship across groups—classes with dense friendship nomination ties.

Thus, features of SABM allowed us to have more confidence that our estimates of friend selection and influence are accurate. More importantly, use of SABM ensured that the results were not based on other network effects such as size and density. For example,

classrooms with only ten students may have more density than classrooms with 25 students, and multilevel modeling does not allow users to account for this. Use of stochastic actor-based models has grown in recent years, especially in relation to older adolescents' school-based friendship networks (e.g., DeLay et al., 2013; Mathys, Burk, & Cillessen, 2013; Osgood et al., 2013). For the current project, the use of RSiena provided insight into the extent to which students are similar to their friends in their views of the classroom climate, specifically teaching practices. We also explored classrooms' characteristics as reported by an external observer and implications for student perceptions (see also Fortuin et al., 2015; Shin & Ryan, 2014b).

Study 3: Peer Norms. Study 3 aims to capture the classroom as social context by assessing its *classroom peer norms* (Chang, 2004). Peer norms are approaches to understanding consensus on classroom beliefs and behaviors that are expected or typical in a classroom as dictated by fellow students or classmates (Shaw, 1981; Veenstra, Dijkstra, & Kreager, 2018). In particular, peer norms for perceptions of the academic classroom climate or autonomy supportive teaching practices may matter, as classrooms are dynamic contexts where adolescents form relationships with their peers and where academic capacities are supposed to be maximized (Rodkin & Ryan, 2012). We focus on two ways of assessing peer norms within the classroom: 1) the average perceptions of student beliefs about teaching practices, or descriptive norms, and 2) the perceptions of teaching practices by students who are deemed "really cool" by their classmates, or status norms.

Descriptive Norms Via Classroom Averages. The most common way to capture peer norms, especially in relation to classroom beliefs and behaviors, has been assessing

descriptive norms, or the average behavior or perceived behavior of *all* individuals in a setting such as the classroom (Wright, Giammorino, & Parad, 1986). According to the person-group similarity model (also called the social context model or the social misfit model), social acceptance of behavior is reinforced by the prevalence of the behavior in a classroom and inhibited if most students do not engage in a certain behavior or hold a certain belief (Chang, 2004; Wright, et al. 1986). For example, aggressive behavior is linked to greater peer acceptance, but only in classrooms that have higher overall aggressive behavior opposed to classrooms where aggressive behavior was infrequent (Boivin, Dodge, & Coie, 1995; Chang, 2004; Stormshak, Bierman, Bruschi, Dodge, & Coie, 1999; Wright et al., 1986). Similar patterns have been found with prosocial behavior and academic achievement (Chang, 2004; Dijkstra & Gest, 2015).

Thus, some work has found descriptive norms to be classroom level characteristics that predict how beliefs and behaviors are linked for individual students (Chang, 2015); however, not all studies show descriptive norms play a role in students' classroom beliefs and behavior (Boor-Klip et al., 2017; Garandeau et al., 2011; Dijkstra & Gest, 2015). Peer descriptive norms for beliefs about the teacher, or average beliefs of all students in the class, is the one of the most common methods for assessing teacher quality or classroom climate. However, little work has examined the extent to which overall student perceptions of teaching practices early in the year play a role in how individual student perceptions of the teacher change. If there is a classroom of students where most students do not find the content or teacher interesting or relevant, might a student who enters the class become more similar to this classroom descriptive norm?

Thus, other aspects of the classroom climate may be related to inconsistencies between classrooms in the extent to which status norms play a role

Status Norms Via Correlates of Coolness.

While there is compelling evidence for the role descriptive norms play in the extent to which early adolescents conform in their beliefs and behaviors, all students in the classroom are not likely to be equally influential. Students' classroom experiences, academic beliefs, and social interactions are shaped by popular peers (Cillessen & Marks, 2011; Dijkstra, Cillessen, & Borch, 2013). Peers with high social status are assumed to have more power (Adler & Adler, 1998), to have be more desired as someone to be associated with (Dijkstra et al. 2013), to have more visibility (Lease, Kennedy, & Axelrod, 2002), and to be more influential than others (Adler, Kless, & Adler, 1992). The extent to which student behaviors or beliefs are associated with high status (e.g., being liked or seen as cool), or with low status (rejection or being seen as uncool) among peers are referred to as status norms (Henry et al., 2000).

Certain peers with status may dictate a norm within classrooms for which behaviors or beliefs are attractive and valuable, referred to as status or popularity norms (Dijkstra & Gest, 2015). Therefore, particularly popular peers' behaviors may become a powerful norm for what is seen as attractive and valuable in a particular context. Classroom status norms could offer important guidelines on how adolescents should behave in order to fit in with the expectations of the peer group and to prevent being seen as a "social misfit" (social misfit theory; Wright et al., 1986). For example, the term "teachers' pet'' is a phrase used to establish a norm set against students' favorable interactions with the teacher. If students approve of a teacher's guidelines, they may lose

status among their peers. However, classrooms are likely to differ in these norms based on the peer makeup and teaching practices within the classroom. The power of status norms is with students' ability to steer fellow adolescents' peer preferences – for instance, whom students prefer as friends (Chang et al. 2007; Stormshak, 1999)

The link between social status and behaviors is an important characteristic for defining the classroom climate (Henry et al., 2000; Boor-Klip et al., 2017). Two types of status have mostly been distinguished: peer preference, which refers to the extent to which adolescents are liked by peers (Wentzel, 2017), and peer popularity, which reflects students' social reputation characterized by social visibility, prestige, and dominance in the peer group (Cillessen & Marks, 2011). One core attribute of perceived popularity is coolness (Adler et al. 1992; Closson, 2009b). While coolness and perceived popularity are not conceptually identical, they represent parallel forms of social status distinct from peer preference and are highly correlated to one another (Closson, 2009; Rodkin et al., 2006). Therefore, the current study used "coolness" as an indicator of perceived popularity.

For example, Galván et al., (2011) showed that over time developmental trends in behaviors, such as aggression, becoming more correlated with coolness. However, a growing number of studies have found that the extent to which a behavior is seen as cool by peers differs greatly between classrooms (Boor-Klip et al., 2015; Garandeau et al., 2011; Dijkstra & Gest, 2015; Jonkmann et al., 2009; Laninga-Wijnen et al., 2018a; 2018b; Meisenger et al., 2007). A cross-sectional study found that peer disapproval for those who exhibit bullying behavior depended on whether popular adolescents in the classroom were bullying (whether bullying was status norm), rather than on involvement

of all classmates (descriptive norm; Dijkstra et al., 2008a). These patterns have been found for academic domains as well, where prosocial behavior and academic achievement are linked with peer approval (Dijkstra & Gest, 2015). These findings suggest that popularity norms - rather than descriptive norms – matter for the extent to which behaviors relate to peer approval and disapproval. Given evidence in favor of both descriptive norms and peer norms, we investigated whether each type of peer norm for perceptions of teaching practices was linked to changes in students' individual perception of the classroom from fall to spring.

Research Question:

Given these three approaches to understanding peer influence on students, I pursue the following three studies for my dissertation.

First, I examine the role of classroom friend groups in predicting student perceptions of teaching practices and student engagement.

Peer Group (via Multilevel Modeling)

Study 1.1 Do classroom friend-groups account for a substantial part of the variance in student engagement and perceptions of teacher autonomy-support (three constructs)?

Study 1.2 Do classroom friend-groups perceptions of disciplinary harshness (one construct of low autonomy-support) predict student engagement?

Second, I examine whether classroom friends are similar in their perceptions of autonomy-supportive practices and how classrooms differ in these dynamics.

Friendship Ties (via RSiena Analyses)

Study 2.1 Are student perceptions of teacher autonomy-support similar to their friends?

Study 2.2 Is similarity in friends' perceptions of autonomy-supportive teaching practices related to classroom differences in observed emotional support?

Third, I examine belief norms set by popular peers (belief correlations of coolness) and average belief in students (descriptive norms) engagement.

Classrooms Descriptive and Status Peer Norms (via Peer Nomination & Class Average)

Study 3 Do classroom descriptive norms and popularity norms for perceptions of autonomy-support predict individual student perceptions (or changes in student perceptions from fall to spring)?

Together, these studies contribute to our understanding of how peers might shape each other's perceptions of the classroom context. Moreover, this work can inform our understanding of how peers and teachers work in conjunction to engage students.

Chapter 3: Method (Applicable to All Studies)

Participants

I used data from the Classroom and Peer Ecologies (CAPE) Project (PI Allison Ryan), a longitudinal study examining student academic adjustment and changes in classroom processes during the transition from elementary to middle school. We collected data in the fall and spring of the 2010-2011 school year from 54 fifth and sixth-grade math and science classrooms. We used multiple sources of data for the study: student surveys, teacher ratings, and third-person observations of the classroom climate. There were 27 sixth-grade classrooms from middle schools (serving grades sixth through eighth), and 27 fifth-grade classrooms from elementary schools (serving kindergarten through fifth grade). To organize survey administration at the middle school level, we collected data from the 6th-grade math and science teachers and chose one of their class periods to participate. These schools are located in small/moderate urban areas in three Midwestern school districts and have comparable demographic composition and achievement scores. The school districts serve a large proportion of low-income (50-71%) and middle-income families. The total sample (N =976) was about half female (50.7%) and ethnically diverse (36.5% African American, 46.8% European American, 7.3% Latino, 6.2% Asian American, and 3.3% other). An additional six classrooms did not have friendship nomination data. These classrooms did not differ in engagement or significantly in demographic makeup from the remainder of the sample.

Procedure

Permission slips with letters describing the project were sent home with all students two weeks before data collection. Eighty-four percent of the students returned consent forms granting them parental permission to participate in the project. Trained administrators gave paper surveys during students' math and science classes (about 60% of students filled out the questionnaire during math class and responded about math, and about 40% of students filled out the survey during science classes and responded about science). Preliminary analyses indicated that the pattern of results for math and science students was similar, so subsequent analyses combined students from math and science classes. We told students that the questionnaire was voluntary and that the purpose was to determine students' beliefs and behaviors. Students were assured that all the information in the survey would be kept confidential, that there were no right or wrong answers, and that this was not a test. A blank sheet of paper was provided for students to cover their answers as they worked on the survey to keep their responses private.

Measures

Friendship. To assess students' classroom friends, we gave students a roster of all students within their classroom. This roster was embedded in each student's survey, and students were told they could nominate as many or as few friends as they wanted by putting a check next to the names of their friends. Students were specifically asked to nominate, "Who are your friends in this class?" with the clarification "the friends you hang around with and talk to the most." See Appendix A.

Peer Nominations of Popularity. Students were asked to nominate which peers within their classroom best fit various descriptors. Embedded within each child's survey

was a class list, and students were told they could nominate as many or as few peers as they wanted by putting a check next to their classmates' names. The item "Which students in your class are really cool?" assessed popularity, in line with Sandstrom, 2011). When creating classroom popularity norms, or belief correlates of coolness, we standardized scores within the classroom (to account for varying class sizes). After standardizing the scores for scores based on the number of nominations, they received for being "really cool", we correlated the students' standardized score for coolness in each classroom with the students' perception of each classroom teaching practice. This gave us a correlation coefficient for each classroom's perceptions correlated with coolness scores, which we used as the status norm for each classroom. See Appendix A.

Autonomy-Support Enhancing Practices. To examine Classroom Motivational Climate, I examined student perceptions of teachers upholding fairness (low disciplinary harshness), promoting voice and choice, and fostering relevance (see Appendix A). These three dimensions were assessed through subscales of the Perceived School Climate Scale (1993) developed by the Center for Prevention Research and Development (CPRD) (see Felner et al., 1997) and subscales of the Rochester's Assessment Package for Schools (Connell, 1990; Wellborn & Connell, 1987). These questionnaires were based on the Classroom Environment Scale (Trickett & Moos, 1987), a widely used and well-validated measure. Changes to the Classroom Environment Scale involved rewording items to eliminate double negatives and providing a more familiar language for colloquial terms. The Perceived School Climate Scale was validated and found to be a reliable measure of school climate (see Brand et al. 2003). See Appendix A for items and constructs assessing autonomy-supportive teaching practice.

Additionally, for each construct of perceptions of autonomy-supportive teaching practices, the items were averaged for their respective construct and then rounded up to the nearest integer to retain the original scale with five categories (1=not at all true, 5=very true), because our estimation method (RSiena) requires that variables have whole-positive values.

Teacher Disciplinary Harshness. This item originated as part of the Perceived School Climate Scale, indicating school harshness. School harshness (Way, Reddy, and Rhodes, 2007; Time 1 α = .65, Time 2 α = .69, Time 3 α = .75), assessed on a 5-point scale (1 = strongly disagree to 5 = strongly agree). This scale measures student perceptions of arbitrary or punitive discipline practices in their classroom; for example, "Students get in trouble for breaking small rules" or "The rules are too strict."

Teacher Promoting Voice and Choice. "Provision of choice" originated from Rochester's Assessment Package for Schools (Connell, 1990; Wellborn & Connell, 1987) and was a scale validated by Assor et al. (2002). This scale was also used in other studies of autonomy-support. Students were asked about the extent to which they have a voice or decision on significant aspects of the classroom (e.g., help decide the classroom rules or how the class time is spent; "Students have a say in how things work").

Teacher Fostering Relevance (Facilitation of Interest and Understanding). "Teacher Foster Relevance" originated from the Rochester's Assessment Package for Schools (Connell, 1990; Wellborn & Connell, 1987) and was a scale validated by Assor et al. (2002), assessed on a 5-point scale (1 = strongly disagree to 5 = strongly

agree). Students were asked about the extent to which their teacher facilitated interest and understanding of content, such as "My teacher explains why it is important to study math."

Student Engagement. Student emotional and behavioral engagement was measured using an established self-report measure of student engagement to assess behavioral engagement and emotional engagement in the classroom (Skinner et al., 2009). For behavioral engagement, six items assessed the extent to which students try hard, participate in classroom activities, exert effort, pay attention, and persist. For example, items included, "I try hard to do well in math/science class" and "I pay attention in my math/science class."

For emotional engagement, four items assessed the extent to which students enjoyed and had positive feelings related to their class experiences. For example, items included, "When we work on something in math/science class, I feel interested" and "I enjoy learning new things in my math/science class." For disruptive behavior, items assessed the extent to which students are off task or disruptive to their own or other students' learning. For example, items included, "I don't follow my (math/science) teacher's directions" and "I get into trouble in my (math/science) class."

For disruptive behavior, we used Kaplan and Maehr's (1999) four item measure These items assessed the extent to which students reported that they are off task or disruptive to their own or other students' learning. For example, items included, "I don't follow my (math/science) teacher's directions" and "I get into trouble in my (math/science) class."

All items use a 5-point Likert response scale (1 = not at all true of me, 3 = somewhat true, and 5 = very true of me). The scores ranged from 1 to 5, with a 5 indicating more or positive behavioral or emotional engagement. Skinner and colleagues (2009) validated the measure by showing students self-reports of engagement aligning with teacher reports of engagement. Our six-item measure of behavioral engagement was reliable in the current sample (Cronbach's alpha = .86 at Wave 1 and .89 at wave 2). Our four-item measure of emotional engagement was also reliable in our sample (Cronbach's alpha = .89 at Wave 1 and .92 at Wave 2). See Appendix B for engagement constructs and items.

Chapter 4: Friend Groups, Their Perceptions, and Student Engagement

Teachers who act in autonomy-supportive and non-controlling ways have students who exhibit a range of positive educational outcomes (Reeve, 2009; Reeve, Deci, & Ryan, 2004), particularly increased student engagement (Jang, 20010; Reeve, Jang, et al., 2004). Little is known about the role of friend groups in how students experience the classroom climate, especially how peers play a role in student perceptions of teaching practices. Despite strides in accounting for individual student variance within classrooms, students observe and interact with teachers almost exclusively in the classroom surrounded by peers. This study aims to understand more about the role of a student's friend groups' perceptions of autonomy-supportive teaching practices and its impact on student engagement. This chapter contains two distinct foci aimed at understanding the role of classroom friend groups in student perceptions and engagement. The first part examines the variance of perceptions accounted for by individuals, friend groups, and entire classrooms simultaneously for each construct of student engagement and perceptions of autonomy-support. Is there evidence of friend group variance in perceptions of teaching practice, indicating classroom sub-climates? The second part examines the extent to which friend group perceptions of the autonomy-supportive practice, disciplinary harshness, predicts engagement, specifically whether friend group perceptions predict engagement above and beyond individual or classroom-level perceptions.

Friend Group Attributes as Predictors

Classroom friends form a context for adolescents (Gifford-Smith et al., 2005). Peer groups, friend groups, or cliques are often used as synonyms, yet are also defined differently

across the literature. For this dissertation, I characterized friend groups according to Frank's (1995) work, such that friend groups or cliques are defined by a high concentration of ties (friend nominations) among actors (students). By this definition, a clique is a cohesive group of students who interact more with each other than with other classmates.

Kinderman (1996) was the first to examine the extent to which friend groups predict student engagement; and Ryan (2001) built upon this work to use multilevel modeling to parse out the variance in individual behavior alongside the variance in peer group membership to understand how changes in peer groups related to changes in individual academic engagement among other academic outcomes. This pioneering work confirmed that friend groups matter for a host of academic outcomes, in particular self-esteem and student engagement.

While classroom climate is inherently a classroom-level construct, this begs the question as to whether there are additional effects or levels besides individuals and classrooms, namely, friend group effects as a level between individual and classroom-level effects. Do student friend groups within the classroom form sub-climates based on shared perceptions of teaching practices or interactions with teachers?

Teachers' "attunement" to peer dynamics has been linked to more favorable student outcomes. However, these teachers' insights say little about what beliefs and behaviors teachers are enacting with this "attuned" knowledge. Several studies suggest that novice teachers are more concerned about whether they are "liked" by their students than teachers with more experience (Arbuckle & Little, 2004; Fuller, 1969; Jones & Vesilind, 1995; Houghton et al. 1988; Martin, Chiodo, & Chang, 2001). Moreover, eye-tracking data highlights that novice teachers focused more attention on students who were seen as off-task or disruptive (Cortina et al., 2015). In contrast, experienced teachers distribute their attention evenly across

all students within their classrooms. Perhaps corresponding to this negative distribution of attention, teachers may fear that one disruptive student may negatively influence their peers and get them off track or have a disproportionate influence on their peers.

Significant Proportion of Variance Between Friend Groups

There is no definitive guide for a meaningful proportion of variance sufficient to make substantial claims for justification for the use of multilevel approaches or that a "level" of variance matters for predicting outcomes. According to Snijders and Bosker (1993), employing the central limit theorem, researchers can estimate the between-classrooms variance to calculate interclass correlations. From this theorem, researchers can expect that given a class size, researchers can predict if between-classrooms variance exists (or whether the null is true). For example, if your average class size is 25 and the variance within is 100, you expect a variance of 4 (100/25) or roughly 4% (4/104 to be precise) to be irrelevant. However, the setting and variables under investigation largely determine the parameter values (Enders et al., 2018; Koo & Lee, 2016). While some researchers, such as Lee and colleagues (2000), asserted that the intraclass correlation needs to be above a certain threshold, such as 5% or 10%, to be non-trivial and be taken into account, most researchers are critical of absolute thresholds as precursors to multilevel analysis. Others, such as Roberts (2007) or Trevethan (2017), have been particularly critical of intraclass correlation thresholds and has argued that group dependence could exist when variables are added to the model even when the intraclass correlations in the null model are near zero.

Study Overview

Many prior studies have asserted that teaching practices are central to creating an autonomy-supportive classroom climate. However, there has been an additional focus of

classroom friend groups in the past few decades as central to a motivating and engaging classroom climate (Kindermann, 2016). There is little work that examines the extent to which individual students within the same context perceive the context differently. To my knowledge, no studies are published that examine the role that classroom friend groups may play in this variance. This study is unique in that it assesses how three levels of student perceptions predict engagement: classroom-wide climate perceptions, friend sub-climates perceptions (or clique perceptions), and students' idiosyncratic assessments of individual students.

The first goal of the study was to examine the extent to which student reports of three autonomy-supportive constructs assess aspects of the classroom environment, peer sub-climates, or idiosyncratic assessments of individual students. This goal required the partitioning of variance in construct scores across three levels: the individual student, the friend group, and the classroom. The study analyzed data from three separate classroom environment constructs that assessed student engagement and students' sense they were in an autonomy-supportive climate. Specifically, we investigated three constructs of student perceptions of autonomy support: support for choices, facilitation of interest and understanding, and responding fairly (or low disciplinary harshness). We also investigated three constructs of student engagement: behavioral engagement, emotional engagement, and disruptive behavior.

The second goal of the current study was to examine the extent to which student reports of one autonomy-supportive construct, disciplinary harshness, predicts student engagement in the fall and spring, and the changes from fall to spring. First, it examined the proportion of variance for a fully unconditional model (null model, without any predictors). Then, examining models with demographic predictors and student prior engagement, also accounting for the partitioning of variance in construct scores across three levels. We also confined this second

part of the study to look exclusively at disciplinary harshness based on findings in part one that suggest that out of the three autonomy-supportive constructions, disciplinary harshness was the one construct with significant peer group variance.

Method

Participants, Data Collection, and Measures

See Chapter 3 Methods.

Analytical procedure

Classroom Friend Groups or Cliques.

To identify classroom friend groups, I used Frank's (1995) KliqueFinder, a specialized software that detects cliques. The KliqueFinder program defines cliques in terms of a concentration of friendship nominations within the cliques relative to the extent of interactions between cliques. Of note, the algorithm still considered non-reciprocal friendship nominations, i.e., when student A indicated that they were friends with student B, but student B did not nominate student A. This is a strength compared to any algorithm based on simple and often somewhat arbitrary rules. The clustering algorithm starts with those who interact directly or indirectly through friends in common— so called subgroup seed. After identifying subgroup seed, the algorithm reassigns student actors to subgroups; it runs several iterations to maximize the cohesiveness index (during these iterations original subgroups dissolve, while subgroups emerge until no different group assignment of a student actor can improve the function cohesiveness index). For details, see Frank (1995) and his introductory manual.

KliqueFinder cliques are non-overlapping with one another. Thus, each student can only belong to one clique even if there are ties and nominations to students in other groups. A best fit algorithm minimizes the inevitable error. Cliques identified through KliqueFinder have

strong theoretical validity, and empirically confirmed as meaningful friend groups from a sociological perspective (Frank et al. 2008; Witvliet et al. 2010). The intention of creating subgroups based on cohesion for this study is that they can be easily fitted as an additional level in standard hierarchical multilevel models widely used in educational research: students nested within friend groups, and friend groups nested within classes.

Hierarchical Linear Modeling. To account for the nested structure of the sample, we used multilevel regression models (HLM7). First, we created a two-level model (classroom–individual) for the first models and a three-level model (classroom–clique–individual) for the second model. We investigated the variation in student perceptions between friend groups compared with the variation in perceptions between classrooms. We studied the null or full unconditional model for each of the teacher autonomy-supportive variables and student engagement variables as well as models with demographic variables. The clustering of observations violates the regression assumption of independence, and ignoring it may lead to biased parameter estimates (Raudenbush & Bryk, 2001). Individual-level (Level 1) is the variance for students, friend group level (Level 2) is the variance between cliques created using Frank's (1995) KliqueFinder, and classroom level (level 3) is the variance between the 46 classrooms in our study.

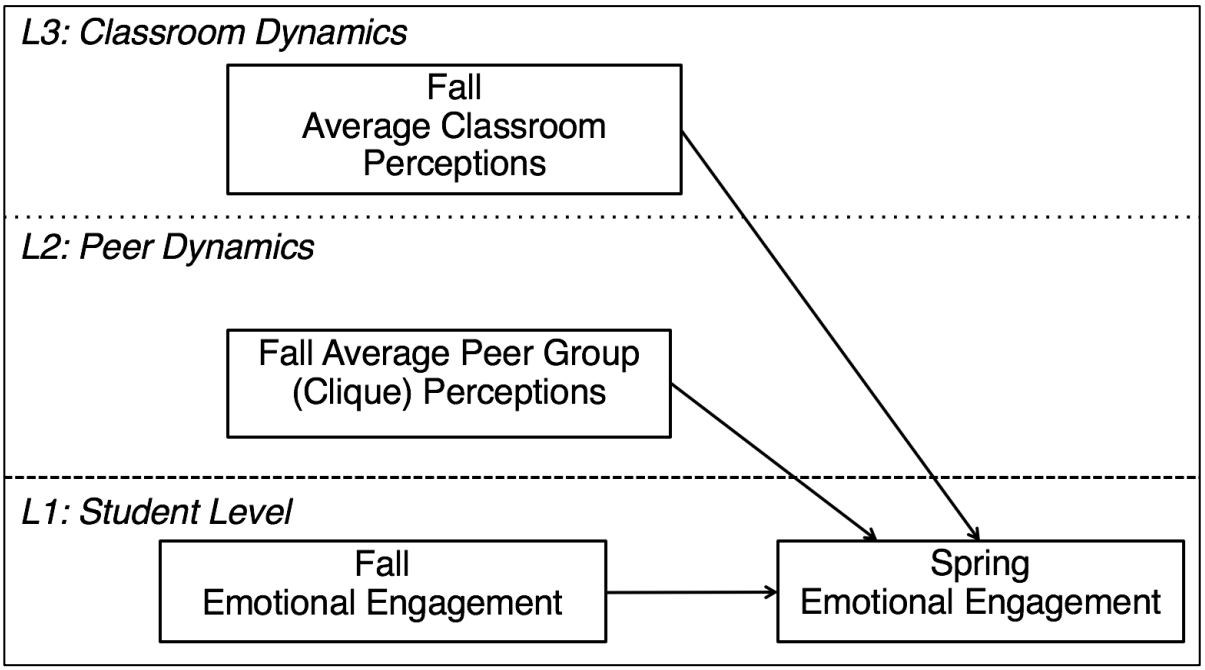
Study 1.1. For the first goal, we estimated a model with an explanatory variable on the clique level. To understand the patterns of engagement, we first examined the null or fully unconditional model for each of the three variables of perceptions of autonomy support and the three variables of engagement. We also examined these models in the more traditional way of looking at a two-level model with individual and classroom-level variance (see Table 1.5).

In addition to comparing the variation between different levels for models with and without peer groups as a level, we also looked variance between fall and spring and accounting for demographic factors. In Tables 1.6 (fall perceptions), 1.7 (fall engagement), and 1.8 (spring engagement account for fall engagement), Model 0 represents the null model with no predictors or full unconditional model. Model 1 represents the addition of demographic. Model 2, in table 1.7, represents fall engagement variables as predicting spring engagement.

Study 1.2 Models. We also used a series of multilevel models to assess our second goal of this study, to understand the effects of individual, friend group, and class-wide perceptions of disciplinary harshness (the one autonomy-supportive variable with significant friend group variance) on student engagement. In particular, these analyses were aimed at understanding if there was additional variance explained by level 2, the clique level above and beyond individual student perceptions.

We ran a series of models for each engagement variable to understand how perceptions of teacher disciplinary harshness were a predictor at each level (i.e., individual, friend group, and classroom; see Table 1.9, 1.11, and 1.13). We also ran parallel models that assess whether effects hold with the addition of controls and the extent to which clique-level perceptions of teacher harshness are greater predictors than individual or classroom predictors (see Tables 1.10, 1.12, and 1.14). See Figure 1 for a model of our analyses.

Figure 1.
Three-Level Hierarchical Linear Model Assessing Fall Individual, Friend Group, and Classroom Level Perceptions of Teaching Practices on Spring Perceptions



Tables 1.9 through 1.14, show each analysis's progression to understand each level of student perceptions (i.e., student, friend group, and classroom level). First, Model 0a, represents the null model with no predictors or the fully unconditional model in all tables. Then, as a baseline to assess fall to spring individual perceptions (Model 0b), we assess fall perceptions of disciplinary harshness as predictors of spring engagement (emotional engagement, behavioral engagement, and disruptive behavior). Model 1 examined individual student perceptions of teacher fairness on student spring engagement, Model 2 assessed average peer perceptions, and Model 3 assessed average classroom perceptions. We then look at all three levels together in Model 4. In supplementary models, we examined these analyses

with demographics. All engagement models with and without demographic patterns follow the same trends.

Results

Descriptive Statistics and Correlations. We first calculated the means and standard deviations for each of our variables at the individual levels by gender and grade level (Table 1.1 and 1.2). There were no gender or subject-level differences in perceptions of teacher autonomy-support (not accounting for nesting). Fifth graders perceived greater teacher promoting choice and relevance than sixth graders, with little difference in disciplinary harshness across grades.

In our preliminary analyses for engagement, trends emerge that are commonly found: boys are less behaviorally engaged and more disruptive than girls but are equally emotionally engaged as girls. Fifth graders were more engaged than sixth graders, but no grade differences were discovered in disruptive behavior. Overall, students are more engaged and less disruptive in science than math. Also, see correlation Tables 1.4 for more information on the descriptive correlates between variables at the individual level.

Table 1.1

Means and Standard Deviations for the Total Sample and by Gender

	Total N=903		Girls N=460		Boy N=443		Mean Difference
	M	SD	M	SD	M	SD	Mgirls - Mboys
Perceptions							
W1 Disciplinary Harshness	2.42	1.04	2.38	1.01	2.46	1.07	-0.08
W2 Disciplinary Harshness	2.64	1.13	2.61	1.12	2.68	1.14	-0.08
W1 Voice & Choice	2.63	0.97	2.63	0.97	2.64	0.97	0.00
W2 Voice & Choice	2.46	1.00	2.44	0.97	2.49	1.04	-0.04
W1 Relevance	3.61	1.02	3.60	0.97	3.62	1.07	-0.02
W2 Relevance	3.44	1.06	3.44	1.05	3.43	1.08	0.02
Engagement							
W1 Behavioral Engagement	4.18	0.77	4.25	0.70	4.11	0.82	0.15**
W2 Behavioral Engagement	4.05	0.86	4.13	0.83	3.98	0.88	0.15*
W1 Emotional Engagement	3.58	1.13	3.58	1.10	3.57	1.17	0.00
W2 Emotional Engagement	3.38	1.19	3.39	1.15	3.37	1.24	0.02
W1 Disruptive Behavior	1.68	0.82	1.54	0.75	1.82	0.87	-0.28***
W2 Disruptive Behavior	1.76	0.90	1.61	0.84	1.91	0.94	-0.30***

Note. M = mean; SD = standard. Values are not standardized/corrected for class size differences nor by gender deviation. Kruskal Wallis test used to calculate p-values.

†p<.1, *p<.05, **p<.01, ***p<.001

Table 1.2

Means and Standard Deviations for the Total Sample and by Grade Level

	Total N=903		5th N=487		6th N=416		Grade Mean Difference
	M	SD	M	SD	M	SD	$M5^{th}$ - $M6^{th}$
Perceptions							
W1 Disciplinary Harshness	2.42	1.04	2.50	1.04	2.32	1.03	0.18*
W2 Disciplinary Harshness	2.64	1.13	2.70	1.14	2.58	1.12	0.12
W1 Voice & Choice	2.63	0.97	2.77	1.00	2.47	0.90	0.30***
W2 Voice & Choice	2.46	1.00	2.56	1.03	2.35	0.96	0.21**
W1 Relevance	3.61	1.02	3.70	1.02	3.51	1.01	0.19**
W2 Relevance	3.44	1.06	3.56	1.03	3.30	1.09	0.26***
Engagement							
W1 Behavioral Engagement	4.18	0.77	4.24	0.76	4.11	0.76	0.13*
W2 Behavioral Engagement	4.05	0.86	4.16	0.82	3.93	0.88	0.23***
W1 Emotional Engagement	3.58	1.13	3.64	1.16	3.50	1.09	0.14†
W2 Emotional Engagement	3.38	1.19	3.50	1.21	3.25	1.16	0.25**
W1 Disruptive Behavior	1.68	0.82	1.68	0.85	1.68	0.79	0.00
W2 Disruptive Behavior	1.76	0.90	1.75	0.90	1.77	0.91	-0.02

Note. M = mean; SD = standard. Values are not standardized/corrected for class size differences nor by gender deviation. Kruskal Wallis test used to calculate p-values.

†p<.1, *p<.05, **p<.01, ***p<.001

Descriptive Statistics: Longitudinal. Between fall and spring, there is a significant decline in student perceptions of teachers promoting voice and choice and fostering relevance, which is accompanied by an increase in student perceptions of disciplinary harshness (Table 1.3). Between fall and spring, students' emotional and behavioral engagement declined, and disruptive behavior increased, though to a lesser extent. Overall, these data reveal that perceptions of teaching practices are not more stable than engagement, and merit further investigation. In Table 1.4, we see the correlations between fall and spring student perceptions and their engagement. The autoregressive correlations for our three student engagement constructs ranged from .54 to .61, and autoregressive correlations for our three teaching practices constructs ranged from 45. to 61. Overall, teacher facilitation of relevance with a correlation between waves at .45 showed the least stability, and student emotional engagement and teacher disciplinary harshness showed the greatest stability with a correlation between waves of .61.

There is no difference between boys and girls for perceptions of teaching practices or emotional engagement. Boys are more likely to report being more disruptive than girls and less behaviorally engaged. Fifth graders perceive their teachers to be more autonomy supportive than sixth-grade teachers. Compared to 6^{th} graders, 5^{th} graders are more behaviorally and emotionally engaged. There are no differences in disruptive behavior between grades.

In Table 1.4, all autocorrelations between fall and spring perceptions ranged between .45 and .61 and engagement .54 and .61; all significant at $p < .001$. Grade and gender correlations follow the same patterns observed with the mean difference tables, with gender differences for behavioral engagement and disruptive behavior and

perception differences between grade levels. When looking at correlations between perception variables, engagement variables, and among each group, nearly all variables are significantly correlated, ranging from -.08 to .46. The exceptions are behavioral and emotional engagement, both correlated at .60, and disruptive behavior, which is not correlated with teachers promoting voice and choice or fostering relevance in the spring or the fall.

Table 1.3

Means and Standard Deviations for the Total Sample and by Wave (Fall and Spring)

	Fall (W1)		Spring (W2)		Mean Difference
	M	SD	M	SD	M Fall – M Spring
Perceptions					
Voice & Choice	2.63	0.97	2.46	1.00	0.17
Relevance	3.61	1.02	3.44	1.06	0.17
Disciplinary Harshness	2.42	1.04	2.64	1.13	-0.22
Engagement					
Behavioral Engagement	4.18	0.76	4.05	1.06	0.13
Emotional Engagement	3.58	1.13	3.38	1.19	0.20
Disruptive Behavior	1.68	0.82	1.76	0.90	-0.08

Note. M = mean; SD = standard deviation. See Table 4 for correlations between waves (W1 and W2) of data.

Table 1.4

Correlations of Variables at the Individual Level (Level 1)

	1. Gender (1=Boys)	2. Grade (1=6th)	3. Disciplinary Harshness	4. Voice and Choice	5. Relevance	6. Behavioral Engagement	7. Emotional Engagement	8. Disruptive Behavior
1. Gender (1=Boys)		.01	.03	.02	-.01	-.09*	-.01	.16**
2. Grade (1=Grade 6)	.01		-.05	-.10**	-.12**	-.13**	-.10**	.01
3. Disciplinary Harshness	.04	-.08*	.61**	-.16**	-.28**	-.30**	-.36**	.40**
4. Voice and Choice	.00	-.15**	-.09*	.50**	.49**	.26**	.35**	-.06
5. Relevance	.01	-.09**	-.17**	.46**	.45**	.46**	.54**	-.18**
6. Behavioral Engagement	.10**	-.08*	-.20**	.14**	.29**	.54**	.65**	-.58**
7. Emotional Engagement	.00	-.06	-.28**	.22**	.37**	.60**	.61**	-.37**
8. Disruptive Behavior	.17**	.00	.32**	-.01	-.05	-.53**	-.28**	.56**

Note: The bottom diagonal of the table shows correlations among variables in the fall and the top diagonal shows the correlations among variables in the spring.

*p<.05, **p<.01

Study 1.1

HLM Fully Unconditional Models for Student Perceptions of Classroom. Friend group for student perceptions of teacher disciplinary harshness accounts for 5% of the variance (χ^2 = 117.60, p < .05) in the fall and a non-significant 2% of the variance in the spring. For student perceptions of teacher autonomy-support, 3% of the variance (χ^2 = 112.71, p = .08) in the fall, and 0% of the variance in the spring was accounted for by peers. Lastly, there was little to no variance in student perceptions of teachers fostering relevance accounted for by friend groups, 0% of the variance in the fall, and 1% of the variance in the spring.

HLM Fully Unconditional Models for Student Engagement. The proportion of variance accounted for by students' friend group for behavioral engagement was not significant in the fall accounting for 0% of the variance and significant in the spring accounting for 3% of the variance (χ^2=128.22, p<.01). For student emotional engagement, friend groups variance was also not significant in the fall accounting for 2% of the variance, and significant in the spring (6% variance; χ^2= 129.92, p<.01). Lastly, friend groups accounted for 9% of the variance for disruptive behavior in the fall (χ^2= 147.05, p<.001) and 5% of the variance in the spring (χ^2= 134.79, p<.01).

Table 1.5

Percentage of Variance Accounted for By Different Effect Levels for Student Engagement and Perceptions of Autonomy Supportive Teaching Practices

	Fall				Spring			
	3-Level		2-Level		3-Level		2-Level	
	Var %	χ^2	Var %	χ^2	Var %	χ^2	Var %	χ^2
Perceptions								
Disciplinary Harshness								
Within Class (σ2)	0.80		0.82		0.78		0.78	
Between Friend Groups (τ00)	0.05	117.60*			0.02	102.47		
Between Class (τ00)	0.15	165.30***	0.18	223.28***	0.20	223.96***	0.22	257.66***
Voice & Choice								
Within Class (σ2)	0.85		0.87		0.82		0.82	
Between Friend Groups (τ00)	0.03	112.71†			0.00	82.26		
Between Class (τ00)	0.12	135.14***	0.13	164.76***	0.18	215.58***	0.18	216.01***
Relevance								
Within Class (σ2)	0.72		0.88		0.84		0.85	
Between Friend Groups (τ00)	0.00	97.61			0.01	99.60		
Between Class (τ00)	0.28	158.45***	0.12	160.48***	0.16	186.34***	0.15	182.58***
Engagement								
Behavioral Engagement								
Within Class (σ2)	0.95		0.94		0.77		0.95	
Between Friend Groups (τ00)	0.00	92.12			0.03	128.22**		
Between Class (τ00)	0.05	96.97***	0.06	97.12***	0.20	72.46*	0.05	91.05***
Emotional Engagement								
Within Class (σ2)	0.86		0.87		0.85		0.89	
Between Friend Groups (τ00)	0.02	103.74			0.06	129.92**		
Between Class (τ00)	0.12	145.95***	0.13	173.16***	0.10	112.86***	0.11	151.36***
Disruptive Behavior								
Within Class (σ2)	0.90		0.96		0.80		0.96	
Between Friend Groups (τ00)	0.09	147.05***			0.05	134.79**		
Between Class (τ00)	0.01	50.20	0.04	82.33***	0.15	62.47†	0.04	84.95***

Note: Var = Percentage of Variance Account for by each variable. Classroom friend groups are based on peer nominations during the fall (W1) data collection.

†p<.10, *p<.05, **p<.01, ***p<.001

Gender, Race, and Changes in Student Perceptions and Engagement. As shown in Tables 1.6, 1.7, and 1.8, student gender was not a significant predictor of any of the student perceptions of teacher practices. For engagement, male students were less behaviorally engaged and more disruptive than female students in the spring. These gender trends for engagement still hold when examining changes between fall and spring engagement but are weaker. There were no gender associations for student emotional engagement across waves.

When looking at the relationship between race and student perceptions, Black students perceived their teachers to be more prone to disciplinary harshness, yet they also were more likely to perceive teachers promoting voice and choice and fostering relevance than peers from other racial groups. Asian students were more likely to perceive teachers promoting voice and choice and fostering relevance than peers from other racial groups. When looking at changes in engagement, Black student perceptions of disciplinary harshness and Asian student perception of relevance predict spring engagement when controlling for fall engagement.

Table 1.6
Multilevel Regression Models with Race and Gender Predicting Fall Student Perceptions of Autonomy-Supportive Teaching Practices

	Teacher Disciplinary Harshness		Teacher Promoting Voice & Choice		Teacher Fostering Relevance	
	Model 0	**Model 1**	**Model 0**	**Model 1**	**Model 0**	**Model 1**
	β (SE)	**β (SE)**	**β (SE)**	**β (SE)**	**β (SE)**	**β (SE)**
Intercept	2.43 (.07)***	2.16 (.09)***	2.64 (.06)***	2.52 (.07)***	3.63 (.06)***	3.47 (.08)***
Level 1						
(L1) Gender		0.12 (.07)†		0.04 (.05)		0.07 (.06)
(L1) Black		0.51 (.08)***		0.17 (.07)*		0.26 (.07)***
(L1) Latinx		0.21 (.15)†		0.13 (.10)		0.26 (.10)*
(L1) Asian		0.06 (.14)		0.31 (.08)***		0.15 (.12)
Variance components						
(L1) Within Class	0.86	0.83	0.80	0.79	0.91	0.90
(L2) Between Friend Groups	0.05	0.03	0.03	0.03	0.00	0.00
(L3) Between Classrooms	0.16	0.16	0.11	0.11	0.35	0.12
(L2) Chi-square	117.60*	105.91	112.71†	110.05	97.61	97.05
(L3) Chi-square	165.30***	172.37***	135.14***	140.21***	158.45***	157.15***
Deviance	2412.41	2318.8	2321.23	2264.15	2380.44	2321.74
No. of Parameters	4	8	4	8	4	8

Note. β = Coefficient and SE = Standard Error; L1 = Level 1. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Table 1.7
Multilevel Regression Models with Race and Gender Predicting Fall Student Engagement

	Behavioral Engagement		Emotional Engagement		Disruptive Behavior	
	Model 0	**Model 1**	**Model 0**	**Model 1**	**Model 0**	**Model 1**
	β (SE)	**β (SE)**	**β (SE)**	**β (SE)**	**β (SE)**	**β (SE)**
Intercept	4.19 (.04)***	4.29 (.05)***	3.59 (.07)***	3.50 (.09)***	1.68 (.04)***	1.41 (.05)***
Level 1						
(L1) Gender		-0.14 (.03)***		0.07 (.07)		0.30 (.05)***
(L1) Black		-0.08 (.06)		0.14 (.09)		0.30 (.08)***
(L1) Latinx		-0.01 (.07)		0.16 (.14)		0.13 (.08)
(L1) Asian		-0.06 (.09)		0.10 (.15)		0.09 (.09)
Variance components						
(L1) Within Class	0.55	0.55	1.10	1.09	0.61	0.60
(L2) Between Friend Groups	0.00	0.00	0.03	0.03	0.06	0.02
(L3) Between Classrooms	0.03	0.03	0.15	0.14	0.01	0.02
(L2) Chi-square	92.12	84.32	103.74	105.12	147.05***	114.09†
(L3) Chi-square	96.97***	98.70***	145.95***	138.61***	50.20	62.65†
Deviance	1968.52	1923.87	2597.96	2547.02	2084.59	2014.02
No. of Parameters	4	8	4	8	4	8

Note. β = Coefficient and SE = Standard Error; L1 = Level 1. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.
†p<.10, *p<.05, **p<.01, ***p<.001

Table 1.8
Multilevel Regression Models Predicting Spring Student Engagement from Student Race and Gender

	Behavioral Engagement			**Emotional Engagement**			**Disruptive Behavior**		
	FUM Model 0	(L1) Dem. Model 1	(L1) W1+ Dem. Model 2	FUM Model 0	(L1) Dem. Model 1	(L1) W1+ Dem. Model 2	FUM Model 0	(L1) Dem. Model 1	(L1) W1+ Dem. Model 2
	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	4.06(.04)***	4.17(.05)***	4.08(.05)***	3.40(.07)***	3.37(.09)***	3.37(.09)***	1.75(.04)***	1.40(.06)***	1.57(.05)***
Level 1									
(L1) Individual Prior (W1)			0.61(04)***			0.64(.03)***			0.57(.04)***
(L1) Gender		-0.14(.07)*	-0.03(.07)*		0.04(.09)	0.05(.08)		0.31(.07)***	0.10(.07)†
(L1) Black		-0.11(.07)	-0.05(.06)		0.01(.09)	-0.06(.08)		0.47(.08)***	0.32(.07)***
(L1) Latinx		-0.09(.14)	-0.06(.13)		0.05(.18)	-0.01(.15)		0.36(.15)*	0.24(.14)†
(L1) Asian		-0.01(.12)	-0.09(.09)		0.18(.19)	0.12(.13)		0.04(.12)	-0.03(.09)
Variance components									
(L1) Within Class (σ2)	0.67	0.68	0.47	1.20	1.22	0.81	0.75	0.71	0.52
(L2) Between Peer Group (τ00)	0.03	0.01	0.03	0.08	0.06	0.02	0.05	0.00	0.00
(L3) Between Class (τ00)	0.17	0.04	0.00	0.14	0.14	0.05	0.14	0.03	0.01
(L2) Chi-square	128.22**	108.09	132.04**	129.92**	123.08*	110.36	134.79**	96.00	82.76
(L3) Chi-square	72.46*	89.70***	54.86	112.86***	118.17***	88.66***	62.47†	80.75**	69.56*
Deviance	2059.40	2001.00	1646.51	2560.98	2504.95	2056.44	2142.49	2025.45	1688.23
No. of Estimate Parameters	4	8	9	4	8	9	4	8	9
Chi-square X^2 (DF) from Model 0		58.40(4)***	412.89(5)***		56.03(4)***	504.54(5)***		117.04(4)***	454.26(5)***
Chi-square X^2 (DF) from Model 1			354.49(1)***			448.51(1)***			337.22(1)***

Note. FUM = Fully Unconditional Model; Dem. = Demographic Variables (race and gender); β = Coefficient and SE = Standard Error; L1 = Level 1. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Study 1.2

For our second research question, we focused on student perceptions of disciplinary harshness, as that was the only variable where there was variation at level 2 for student perceptions. Since perceptions of teachers promoting voice and choice and fostering relevance did not have any variance among friend groups, we felt understanding the extent to which peer perceptions influence engagement did not warrant further investigation given the results of Study 1.1. Even if the percentages were significant, their substantive meaning may be best explained by demographics homophily, as found by prior work (e.g., Crosnoe et al., 2008; Frank et al. 2008)

We found that individual variance strongly and significantly predicted all three constructs of engagement in the expected ways when entered into models separately (See Models 1 through 4 in Tables 1.9, 1.11, and 1.13). We found no evidence that friend group or classroom-wide average perceptions predict student engagement above and beyond individual perceptions for these effects. We also found a non-significant trend of friend groups predicting behavioral engagement and significant class-wide perceptions of disciplinary harshness, which predicted behavioral engagement changes from fall to spring. These patterns are the same regardless of whether we controlled for prior engagement when predicting spring engagement (see Models 1 through 4 in Tables 1.10, 1.12, and 1.14)

Table 1.9

Multilevel Regression Models Predicting Spring Student Behavioral Engagement from Student Perceptions of Teacher Disciplinary Harshness Without Fall Perceptions

	FUM	(L1) Harshness (L2) (L3)	(L1) (L2) Harshness (L3)	(L1) (L2) (L3) Harshness	(L1) (L2) Harshness (L3) Harshness	(L1) Harshness (L2) Harshness (L3) Harshness
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5
	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	4.06(.04)***	4.06(.04)***	4.07(004)***	4.05(.04)***	4.07(.04)***	4.08(.05)***
Level 1						
(L1) Individual Harshness Perceptions		-0.21(.03)***				-0.20(.04)***
Level 2						
(L2) Avg. Friend Groups Harshness Perceptions			-0.20(.05)***		-0.22(.11)**	-0.03(.08)
Level 3						
(L3) Avg. Classroom Harshness Perceptions				-0.18(.08)*	0.04(.11)	0.04(.11)
Cross Level Interactions						
(L1) Individual Prior Harshness Perceptions x (L2) Avg. Friend Groups Harshness Perceptions						-0.04(.05)
(L1) Individual Prior Harshness Perceptions x (L3) Avg. Classroom Harshness Perceptions						.06(.11)
Variance components						
(L1) Within Class (σ2)	0.67	0.63	0.67	0.67	0.67	0.63
(L2) Between Peer Group (τ00)	0.03	0.02	0.03	0.03	0.02	0.02
(L3) Between Class (τ00)	0.17	0.02	0.03	0.02	0.03	0.02
Model Fit						
L2 Chi-square	128.22**	117.43*	120.73*	128.55**	120.52*	116.82*
L3 Chi-square	72.46*	69.42*	69.99*	64.95*	70.30*	69.28*
Deviance	2059.40	1888.27	2049.38	2054.71	2049.29	1887.16
No. of Estimate Parameters	4	5	5	5	6	9
Chi-squared difference test: X^2 (df), p-value						
Comparison with Model 0		171.13(1)***	93.11(1)***	87.78(1)***	161.02(1)***	172.24(4)***
Comparison with Model 5 and Model 1					.09(1)	1.11(4)

Note. FUM = Fully Unconditional Model; Harshness or Harshness Perceptions = Student Perceptions of Teacher Disciplinary Harshness; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2; df = degrees of freedom. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Table 1.10

Multilevel Regression Models Predicting Spring Student Behavioral Engagement from Student Perceptions of Teacher Disciplinary Harshness Controlling for Fall Perceptions

	FUM	(L1) Behavioral Eng. (L2) (L3)	(L1) Behavioral Eng. + Harshness (L2) (L3)	(L1) Behavioral Eng. (L2) Harshness (L3)	(L1) Behavioral Eng. (L2) (L3) Harshness	(L1) Behavioral Eng. + Harshness (L2) Harshness (L3) Harshness	(L1) Behavioral Eng. + Harshness (L2) Harshness (L3) Harshness
	Model 0a	Model 0b	Model 1	Model 2	Model 3	Model 4	Model 5
	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	4.06(.04)***	4.05(.03)***	4.05(.03)***	4.05(.03)***	4.05(.03)***	4.05(.03)***	4.05(.03)***
Level 1							
(L1) Individual Prior (W1) Behavioral Engagement		0.62(.04)***	0.59(.04)***	0.61(.04)***	0.62(.04)***	0.62(.04)***	0.60(.05)***
(L1) Individual Harshness Perceptions			-0.13(.03)***				-0.14(.03)***
Level 2							
(L2) Avg. Friend Groups Harshness Perceptions				-0.09(.05)†		-0.00(.03)	0.10(.08)
Level 3							
(L3) Avg. Classroom Harshness Perceptions					-0.12(.05)*	-0.10(.10)	-0.10(.10)
Cross Level Interactions							
(L1) Individual Prior Behavioral Engagement x (L2) Avg. Friend Groups Harshness Perceptions				-0.02(.06)		-0.05(.08)	-0.07(.08)
(L1) Individual Prior Behavioral Engagement x (L3) Avg. Classroom Harshness Perceptions					-0.00(.08)	0.05(.11)	0.09(.11)
Variance components							
(L1) Within Class (σ2)	0.67	0.47	0.45	0.47	0.47	0.47	0.45
(L2) Between Peer Group (τ00)	0.03	0.02	0.04	0.03	0.03	0.03	0.03
(L3) Between Class (τ00)	0.17	0.01	0.00	0.00	0.01	0.00	0.00
Model Fit							
L2 Chi-square	128.22**	142.41***	146.89***	142.48***	142.61***	142.19***	145.71***
L3 Chi-square	72.46*	59.06†	46.41	47.06†	47.21	47.19	46.59
Deviance	2059.40	1682.36	1642.10	1678.96	1678.26	1677.90	1640.22
No. of Estimate Parameters	4	5	6	7	7	9	10
Chi-squared difference test: X^2 (DF), p-value							
Comparison with Model 0		377.03(2)***	246.17(1)***				
Comparison with Model 5 and Model 1			40.26(1)***	3.40(2)	4.09(2)	4.46(4)	42.13(5)***

Note. FUM = Fully Unconditional Model; Harshness or Harshness Perceptions = Student Perceptions of Teacher Disciplinary Harshness; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2; df = degrees of freedom. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Table 1.11
Multilevel Regression Models Predicting Spring Student Emotional Engagement from Student Perceptions of Teacher Disciplinary Harshness Without Fall Perceptions

	FUM	(L1) Harshness (L2) (L3)	(L1) (L2) Harshness (L3)	(L1) (L2) (L3) Harshness	(L1) (L2) Harshness (L3) Harshness	(L1) Harshness (L2) Harshness (L3) Harshness
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5
	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	3.40(.07)***	3.41(.07)***	3.42(.07)***	3.39(.07)***	3.42(.07)***	3.45(.08)***
Level 1						
(L1) Individual Harshness Perceptions		-0.31(.05)***				-0.29(.06)***
Level 2						
(L2) Avg. Friend Groups Harshness Perceptions			-0.33(.08)***		-0.36(.12)**	-0.12(.12)
Level 3						
(L3) Avg. Classroom Harshness Perceptions				-0.28(.12)*	0.08(.18)	0.12(.18)
Cross Level Interactions						
(L1) Individual Prior Harshness Perceptions x (L2) Avg. Friend Groups Harshness Perceptions						-0.07(.11)
(L1) Individual Prior Harshness Perceptions x (L3) Avg. Classroom Harshness Perceptions						-0.02(.14)
Variance components						
(L1) Within Class (σ2)	1.20	1.12	1.20	1.20	1.20	1.12
(L2) Between Peer Group (τ00)	0.08	0.05	0.06	0.08	0.06	0.05
(L3) Between Class (τ00)	0.14	0.13	0.13	0.12	0.13	0.13
Model Fit						
L2 Chi-square	129.92**	118.32*	118.73*	130.05**	118.51*	117.38*
L3 Chi-square	112.86***	120.23***	114.35***	103.90***	114.60***	121.72***
Deviance	2560.98	2367.91	2549.02	2557.01	2548.82	2366.12
No. of Estimate Parameters	4	5	5	5	6	9
Chi-squared difference test: X^2 (df), p-value						
Comparison with Model 0		193.07(1)***	11.96(1)***	3.97(1)***	180.91(1)***	194.86(5)***
Comparison with Model 5 and Model 1						1.79(4)

Note. FUM = Fully Unconditional Model; Harshness or Harshness Perceptions = Student Perceptions of Teacher Disciplinary Harshness; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2; df = degrees of freedom. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Table 1.12

Multilevel Regression Models Predicting Spring Student Emotional Eng. from Student Perceptions of Teacher Disciplinary Harshness Controlling for Fall Perceptions

	FUM	(L1) Emotional Eng. (L2) (L3)	(L1) Emotional Eng. + Harshness (L2) (L3)	(L1) Emotional Eng. (L2) Harshness (L3)	(L1) Emotional Eng. (L2) (L3) Harshness	(L1) Emotional Eng. + Harshness (L2) Harshness (L3) Harshness	(L1) Emotional Eng. + Harshness (L2) Harshness (L3) Harshness
	Model 0a	Model 0b	Model 1	Model 2	Model 3	Model 4	Model 5
	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	3.40(.07)***	3.38(.05)***	3.39(.05)***	3.39(.05)***	3.39(.05)***	3.39(.05)***	3.39(.05)***
Level 1							
(L1) Individual Prior (W1) Emotional Engagement		0.63(.03)***	0.60(.04)***	0.63(.03)***	0.63(.03)***	0.64(.03)***	0.62(.03)***
(L1) Individual Harshness Perceptions			-0.13(.04)***				-0.14(.05)**
Level 2							
(L2) Avg. Friend Groups Harshness Perceptions				-0.11(.06)†		-0.12(.11)	0.01(.11)
Level 3							
(L3) Avg. Classroom Harshness Perceptions					-0.09(.08)	-0.04(.15)	0.04(.15)
Cross Level Interactions							
(L1) Individual Prior Emotional Engagement x (L2) Avg. Friend Groups Harshness Perceptions				-0.01(.04)		-0.14(.08)†	-0.17(.08)*
(L1) Individual Prior Emotional Engagement x (L3) Avg. Classroom Harshness Perceptions					0.08(.06)	0.22(.12)†	0.24(.13)†
Variance components							
(L1) Within Class (σ2)	1.20	0.81	0.79	0.81	0.80	0.80	0.79
(L2) Between Peer Group (τ00)	0.08	0.03	0.04	0.03	0.04	0.03	0.03
(L3) Between Class (τ00)	0.14	0.05	0.05	0.05	0.05	0.05	0.05
Model Fit							
L2 Chi-square	129.92**	117.08*	119.15*	115.36*	117.72*	114.47†	118.13*
L3 Chi-square	112.86***	83.99***	86.59***	84.43***	82.29***	87.36***	85.56***
Deviance	2560.98	2096.27	2073.08	2094.13	2094.20	2089.78	2067.84
No. of Estimate Parameters	4	5	6	5	7	9	10
Chi-squared difference test: X^2 (df), p-value							
Comparison with Model 0		464.71(1)***	487.90(2)***				
Comparison with Model 5 and Model 1			23.19(1)***	2.14(1)	2.08(2)	6.49(4)	28.42(5)***

Note. FUM = Fully Unconditional Model; Harshness or Harshness Perceptions = Student Perceptions of Teacher Disciplinary Harshness; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2; df = degrees of freedom. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Table 1.13

Multilevel Regression Models Predicting Spring Student Disruptive Behavior from Student Perceptions of Teacher Disciplinary Harshness Without Fall Perceptions

	FUM	(L1) Harshness (L2) (L3)	(L1) (L2) Harshness (L3)	(L1) (L2) (L3) Harshness	(L1) (L2) Harshness (L3) Harshness	(L1) Harshness (L2) Harshness (L3) Harshness
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5
	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	1.75(.04)***	1.75(.04)***	1.74(.04)***	1.76(.04)***	1.73(.04)***	1.72(.05)***
Level 1						
(L1) Individual Prior (W1) Disruptuve Behavior						
(L1) Individual Harshness Perceptions		0.30(.03)***				0.24(.04)***
Level 2						
(L2) Avg. Friend Groups Harshness Perceptions			0.33(.05)***		0.46(.09)***	0.21(.08)*
Level 3						
(L3) Avg. Classroom Harshness Perceptions				0.24(.07)***	-0.22(.12)†	-0.29(.11)**
Cross Level Interactions						
(L1) Individual Prior Harshness Perceptions x (L2) Avg. Friend Groups Harshness Perceptions						0.25(.09)**
(L1) Individual Prior Harshness Perceptions x (L3) Avg. Classroom Harshness Perceptions						-0.22(.11)*
Variance components						
(L1) Within Class (σ2)	0.75	0.68	0.74	0.75	0.74	0.68
(L2) Between Peer Group (τ00)	0.05	0.01	0.02	0.05	0.02	0.01
(L3) Between Class (τ00)	0.14	0.02	0.02	0.01	0.02	0.02
Model Fit						
L2 Chi-square	134.79**	104.80*	108.08	134.99**	105.54	99.09
L3 Chi-square	62.47†	70.29*	66.73*	51.91	67.23*	73.39**
Deviance	2142.49	1936.89	2114.10	2133.55	2110.77	1923.69
No. of Estimate Parameters	4	5	5	5	6	9
Chi-squared difference test: X^2 (df), p-value						
Comparison with Model 0		205.60(1)***	28.39(1)***	8.94(1)**	173.89(1)***	218,89(5)***
Comparison with Model 5 and Model 1						13.20(4)**

Note. FUM = Fully Unconditional Model; Harshness or Harshness Perceptions = Student Perceptions of Teacher Disciplinary Harshness; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2; df = degrees of freedom. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Table 1.14

Multilevel Regression Models Predicting Spring Student Disruptive Behavior from Student Perceptions of Teacher Disciplinary Harshness Controlling for Fall Perceptions

	FUM	(L1) Disruptive Beh. (L2) (L3)	(L1) Disruptive Beh. + Harshness (L2) (L3)	(L1) Disruptive Beh. (L2) Harshness (L3)	(L1) Disruptive Beh. (L2) (L3) Harshness	(L1) Disruptive Beh. (L2) Harshness (L3) Harshness	(L1) Disruptive Beh. + Harshness (L2) Harshness (L3) Harshness
	Model 0a	Model 0b	Model 1	Model 2	Model 3	Model 4	Model 5
	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	1.75(.04)***	1.76(.03)***	1.76(.03)***	1.76(.03)***	1.77(.03)***	1.76(.03)***	1.76(.03)***
Level 1							
(L1) Individual Prior (W1) Disruptuve Behavior		0.62(.03)***	0.55(.04)***	0.62(.05)***	0.61(.04)***	0.62(.05)***	0.58(.05)***
(L1) Individual Harshness Perceptions			0.15(.03)***				0.15(.04)***
Level 2							
(L2) Avg. Friend Groups Harshness Perceptions				0.16(.05)***		.22(.08)**	0.10(.08)
Level 3							
(L3) Avg. Classroom Harshness Perceptions					0.12(.06)*	-0.10(.10)	-0.11(.10)
Cross Level Interactions							
(L1) Individual Prior Disruptuve Behavior x (L2) Avg. Friend Groups Harshness Perceptions				-0.01(.04)		-0.13(.09)	-0.14(.09)†
(L1) Individual Prior Disruptuve Behavior x (L3) Avg. Classroom Harshness Perceptions					0.08(.06)	0.06(.11)	0.08(.10)
Variance components							
(L1) Within Class (σ2)	0.75	0.54	0.52	0.53	0.54	0.53	0.53
(L2) Between Peer Group (τ00)	0.05	0.01	0.00	0.00	0.00	0.00	0.00
(L3) Between Class (τ00)	0.14	0.13	0.01	0.01	0.01	0.01	0.01
Model Fit							
L2 Chi-square	134.79**	91.52	87.56	86.07	91.89	85.52	85.52
L3 Chi-square	62.47†	72.26*	69.59*	67.45*	67.13*	66.49*	66.49*
Deviance	2142.49	1745.64	1708.14	1732.62	1741.15	1731.30	1731.30
No. of Estimate Parameters	4	5	6	7	7	9	10
Chi-squared difference test: X^2 (df), p-value							
Comparison with Model 0		396.85(1)***	434.35(2)***				
Comparison with Model 5 and Model 1			37.50(1)***	13.02(1)**	355.12(2)***	14.34(4)**	15.00(5)***

Note. FUM = Fully Unconditional Model; Harshness or Harshness Perceptions = Student Perceptions of Teacher Disciplinary Harshness; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2; df = degrees of freedom. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Discussion

This study's primary purpose was to understand the role of friend groups in student perceptions of teachers and engagement. There were two main goals within this broader study: 1) to examine the extent to which friend groups account for the variance in perceptions of autonomy-supportive teaching practices, and 2) to examine the extent to which friend groups' perceptions of autonomy-controlling practice (disciplinary harshness) predicted engagement. While friend groups account for a significant proportion of variance in student engagement, teacher disciplinary harshness was the only student perception to have variance that could be attributed to peer groups, even after accounting for race and gender. Nonetheless, fall friend group perceptions of disciplinary harshness did not predict spring engagement above and beyond individual student perceptions. This work highlights the importance of understanding the limitations of peer influence in classrooms and not overestimating the importance of peer influences at the expense of the influential role of the teacher.

Given these findings, it may be important for teachers to focus on individual connections and overall classroom attitudes in managing classrooms rather than focus too much attention on any group of students. Using eye-tracking data, Cortina et al.'s (2015) found that experienced teachers are more likely to distribute their attention equally among students, whereas novice teachers are focused on a few select students at a time. Taken together with our findings, social management dynamics training can help teachers know what they do not need to be attuned to; according to our findings they do not need to attune to the influence of peer perceptions of teaching practices. Moreover, while there is growing attention towards the importance of peers in relation to student academic and

engagement outcomes, students may form their beliefs early in the school year. Thus, to understand the mechanisms for the similarity between individual student perceptions and their friend group perceptions, examining these processes earlier in the year may provide greater insights.

Although friend groups are likely to form based on similarity in psychological characteristics (McPherson, Smith-Lovin & Cook, 2001), it is not surprising that individual effects are, in part, overshadowed when classroom characteristics or individual student perceptions are taken into account. Results demonstrated that the degree to which adolescents are integrated into the social dynamics within their classroom is perhaps related to their perceptions of teacher disciplinary harshness. It is also important to consider that the extent to which individuals overlap in similarity to their friend group is challenging to parse with our methodological approach. The self-selection into friend groups might mask the actual dynamic that friends have over perceptions of teaching practices. The present study of the dissertation focused on whether friend groups may predict changes, or "influence" student perceptions of teaching practices. However, an equally important mechanisms in peer dynamics is the extent to which student friendships dissolve and form, such that students may be selecting into groups who have the same beliefs as them rather than becoming more like those in their existing friend group.

The findings of study 1.1 support that variance in individual perceptions of teaching practices is most strongly explained by individual student differences followed by classroom-level difference. Only a small proportion of variance was explained by student friend groups for all three autonomy-supportive variances, with differences between friend group perceptions of disciplinary harshness being the only significant

perceptions explained by classroom friend groups. When investigating the variance accounted for by each level of a three-level model in contrast with a two-level model, we do see that friend groups can account for the variance explained by individual student perceptions. We see that Black students perceive that there is greater disciplinary harshness than their White peers, which explains a significant proportion of variance above and beyond the null model.

Overall, the findings from study 1.1 point to the importance of friend group variance for engagement, but not for perceptions of teacher autonomy-support, aside from disciplinary harshness. In our analysis, there were significant differences between friends groups in perceptions of disciplinary harshness in the fall; however, this pattern was not found in the spring. We also did not find there were significant differences in peer group perceptions of teachers promoting voice and choice or teachers fostering relevance in the fall or spring, contrary to our hypothesis. We found perceptions of disciplinary harshness in the fall varied significantly between friend groups. Yet, there was too much overlap in variance between individual perceptions and friend group perceptions such that they did not affect engagement.

The results suggest that incorporating friend group perceptions of disciplinary harshness into future research efforts may provide a more complete picture of the classroom environment. This may be looked at in conjunction with previous research using self-determination theory or other motivational frameworks, as it has focused on how peers may play a role in students' belongingness in the classroom during adolescence (e.g., Van Ryzin, Gravely, & Roseth, 2009; Feldlaufer et al. 1988; Midgley et al. 1989; Roeser et al. 1996; Roeser & Eccles 1998). Future research assessing the

various peer factors could simultaneously contribute to untangling these effects. For this study, we found that complexity cannot be ignored when seeking to understand the role that peer groups play in different constructs that fall under what is defined as autonomy-supportive teaching practices at the classroom level. However, our results suggest there are areas to simplify (or rather avoid over complicating), as peer groups do not add to our understanding of teachers fostering relevance. In this way, our findings provide evidence that teachers and researchers can direct their attention on other aspects of teacher-student relationships.

Our study 1.2 provided evidence that despite growing interest in the influence of classroom friends on one another, this influence does not seem to be linked to classmates' views of the climate, specifically teachers' autonomy-support. Prior work has found that earlier career teachers are especially worried about the extent to which students view them negatively and tend to attune to particular students. The latter might get the class off track. Overall, it seems that teachers make impressions on individual students entering their classrooms more or less unbiased by the perception of their peers. There is a growing body of work that highlights the importance of peers for engagement. Yet, there have been questions related to whether peers within classrooms can, in fact, negatively influence classmates. Perhaps these teachers had "social management-dynamics," which Farmer et al. (2019) outlined as a set of skills that teachers adopted following a series of interventions supporting them with attunement to student peer relationships within their classrooms.

There is ample evidence that peers influence each other's engagement, and our findings somewhat suggest that there is more friend group variance in student

engagement than in student perceptions. However, the effect of friend groups after controlling for student race and gender is confined to student disruptive behavior. This finding aligns with a wealth of prior work highlighting peer influence on deviant behavior, including aggression and delinquent behaviors (e.g., skipping class and substance abuse).

Strengths and Limitations (Limitations and Future Directions)

Given how we identified friend groups and accounted for them in the model, 47 student isolates that did not fit into a group were not accounted for at the friend group level and were not included in the study. Thus, the beliefs of isolated students are not accounted for in this current design. Prior work by Wölfer et al. 2012 showed that social isolation is not enough to address this issue on the individual level. Still, intervention strategies have to be designed and implemented, so that friend groups are considered units of intervention. For instance, programs have to consider the social norms on the group level that influence adolescents' attitudes, such as acceptance of aggression or empathy for isolates, and, consequently, shaping their behavior. Perhaps views that are different than the rest of the students within a class may be the perceptions of isolated students. Understanding the experience of autonomy-supportive practice among isolated students is particularly important for future studies to examine.

A challenge for ongoing studies is to analyze social networks longitudinally. In the present study, social network analyses are social network analysis snapshots of the peer networks in the fall of the school year, although networks are more dynamic systems than stable compositions (Knoke & Yang, 2008). Explaining the fluctuation of network positions allowed us to better understand the friend group generation, especially why

specific individuals enter a specific friend group, and how isolates become banished to the fringes of a social network. Longitudinal network studies are also helpful to address the question of causality between social integration and social skills and to explore the ambivalent role of relational aggression in its association to social integration. Our approach to predicting social integration on the individual and group level neglects the specific environment. From a multilevel perspective, it would be interesting to consider the class level additionally.

One strength of this study was our ability to include a third level with variance at the class level. We sought to understand whether friend groups played a role above and beyond individual and classroom level characteristics. As prior work often examines how other individual traits are related to friend group perceptions, it is important to parse out what variance overlaps at the individual and friendship levels. Whereas previous studies primarily focused on examining the effects of friend groups' behavior on student outcomes, the novel social network and multilevel perspective yielded several interesting results concerning individual and classroom level effects and friend group effects.

Conclusion

Overall, there were only modest friend group differences in student perceptions of teaching perceptions, especially after accounting for student race, gender, and fall engagement. Friend group perceptions of disciplinary harshness also did not predict engagement above and beyond individual perceptions. The implications of these findings point to the importance of teachers focusing on individual relationships with students and the importance of future research on the extent to which individuals share perceptions with their peers. The implications of these findings are that friend group perceptions and

classroom-wide perceptions are less important for understanding student engagement—or the development of factors that affected how individuals interact with teachers merits further attention. Overall, this work does not offer compelling evidence that students become more like their peer group in perceptions from fall to spring. However, there is compelling evidence student perceptions of the teacher are closely aligned with, if not the same as, their peer groups. Future work should go beyond understanding how friend groups alter student perceptions and instead identify the extent to which students form peer groups with those who share beliefs and investigate the power of self-selection into friend groups and the maintenance of those friend groups over the course of the school year.

Chapter 5: Shared Perceptions of Autonomy-Support and the Formation of Friendships

While students have little control over much of the school context, they do get to choose their friends. Students may look to the friends they choose to gain information within the classroom. Evidence of these processes comes from the phenomena called homophily (Veenstra, Dijkstra, Steglich, & Van Zalk, 2013). Homophily is the extent to which students tend to be similar to their friends in demographic characteristics, behaviors, and beliefs (McPherson et al., 2001; Shin & Ryan, 2014a; Shin & Ryan, 2014b; Veenstra et al., 2013). Peer effects that contribute to homophily have been categorized into two main processes: the selection of friends and the influence of those friendships. While much research has looked at peer selection and influence effects on academic engagement, motivation, and achievement (Ryan, 2001; Shin & Ryan, 2017; Altermatt & Pomerantz, 2003; Kindermann, 2007), few studies have examined peer effects on precursors to those outcomes, such as the perception of classroom teachers. For example, classroom friends may make comments on the extent to which their teacher is fair or harsh. In turn, these comments can influence how students develop views of a particular class or can elicit the formation or dissolving of a friendship.

Student perceptions of an autonomy-supportive and autonomy-controlling environment vary greatly among students within the same classroom and between classrooms and schools. This within-classroom variance may be especially salient for student perceptions of disciplinary harshness, which have also been linked to within-

classroom differences in race and gender (Brand et al., 2003; Mattison & Aber, 2007). While the notion of a single "classroom climate" has largely been dispelled, prior work has focused on individual differences—rather than peer or friend groups—as the mechanism behind different perceptions (Shukla et al. 2016; Weinstein, 2002; Hoy & Weinstein, 2006). Understanding how student perceptions of autonomy-support more broadly, especially teacher disciplinary harshness, are linked to classroom friendships (or vice versa) may help explain the mechanisms through which teachers and peers jointly create the classroom social and motivational climate.

While the first study (chapter 4) of the dissertation focused on the extent to which peer groups predicted changes in student engagement, there were limitations with the approach of confining students within one peer group, as discussed in the literature review. Thus, this study aims to use a different approach to examine the role friends play in perceptions of the teaching practices, namely understanding how individual ties between students form networks and change from fall to spring.

In the current study (study 2, chapter 5 of the dissertation), we investigate friendship similarity regarding student perceptions of autonomy-support, specifically their teacher's disciplinary harshness, facilitation of interest and understanding, and giving students a voice and choices in the classroom (via selection, maintenance, and influence). For the first part of this study, we simultaneously investigated whether early adolescents *select* classroom friends who have similar perceptions of teaching practices as their own, *maintain* classroom friends with shared perceptions of teaching practices, and/or "*influence"* (i.e., become more like) classroom friends in their perceptions of teaching practices. For the second part of this study, we examine how these processes

differ by classroom-wide attributes, especially observer reports of teacher emotional support.

Teacher Emotional Support and Social Management Dynamics

While this study focuses on peer processes as potential socializers of student perceptions of teaching practices, teachers perhaps play the most significant or at least a central role in how students perceive their instruction. Aside from student average perceptions, the other common way of assessing teaching practices is through trained observations. These observations can shed light on teaching aspects that students may not be aware of and lend themselves to be used for teacher training purposes, particularly if combined with specific descriptions of scoring to understand what implementation looks like.

The Classroom Assessment Scoring System (CLASS) has become a widely used protocol aimed at measuring aspects of instruction and teaching quality (Pianta et al., 2012). In particular, the CLASS's Emotional Support dimension has been linked to student outcomes and peer dynamics (Hafen et al., 2015; Hamre et al., 2013). The four meaningful dimensions that make up Emotional Support include positive climate, negative climate, teacher sensitivity, and regard for student perspective.

Ruzek and colleagues (2016) investigated how three overarching facets of self-determination theory (students' sense of autonomy support, competence, and peer belongingness) mediated observed *Emotional Support* and self-reported behavioral engagement. They found students' sense of autonomy support and peer belongingness mediated the relationship between *Emotional Support* and behavioral engagement. The CLASS dimension of Regard for Student Perspective (a subdimension of the CLASS)

aligns with aspects of an autonomy-supportive climate as Ruzek et al. (2016) described that these classrooms allow for a "relaxed structure for movement about the classroom" and "peer sharing and group work" (p. 98).

Moreover, Shin and Ryan (2017) found that teacher emotional support moderates the extent to which peers influence disruptive behavior. Specifically, disruptive behavior was higher in classrooms with low teacher emotional support in contrast to classes with high emotional support. Moreover, classroom friends were similar in disruptive behavior in classes with low teacher emotional support. Given these findings, classrooms with low emotional support may lend themselves to greater peer influence. This provides support that there may be greater homophily in beliefs and behavior when there is low teacher emotional support. Perhaps students do not feel related to their teacher, and thus rely more on their peers.

Yet homophily for student perceptions of the classroom may operate differently in response to teacher emotional support than disruptive behaviors. Schenke et al. (2018) assessed a host of student characteristics in relation to average teacher support and the extent to which there was student consensus and dispersion of their perceptions of teacher emotional support. While our study focused on teacher-autonomy practices, we might expect classrooms with high observed emotional support to have more students' share the views of the teacher *and* to form friendship ties, thus, students selecting more friends whose view is similar to their own. If there are differences in peer friendship processes between classrooms with high and low observed teacher support, these changes in dynamics may be reflective of what Farmer and colleagues (2018) refer to as social management dynamics, or the extent to which teachers enact practice in their classroom

that facilitate positive interactions among students. This study investigated the mechanisms that drive homophily of student perceptions teacher autonomy-supportive practices and whether these processes differ based on observed teacher emotional support.

Research questions

1. Do students share perceptions of teacher autonomy-supportive practice with their classroom friends?

2. Are these patterns of homophily shaped by students selecting, maintaining, or influencing classroom friends in relation to belief about autonomy-supportive teaching practices?

3. Does friendship similarity in perceptions of autonomy supportive practices depend on whether or not they are in an emotionally supportive classroom?

See Figure 2 for our conceptual model assessing these questions.

Figure 2.

Stochastic Actor-Based Model of Co-Evolution Between Autonomy-Supportive Teaching Practices and Friendship Selection, Maintenance, and Influence

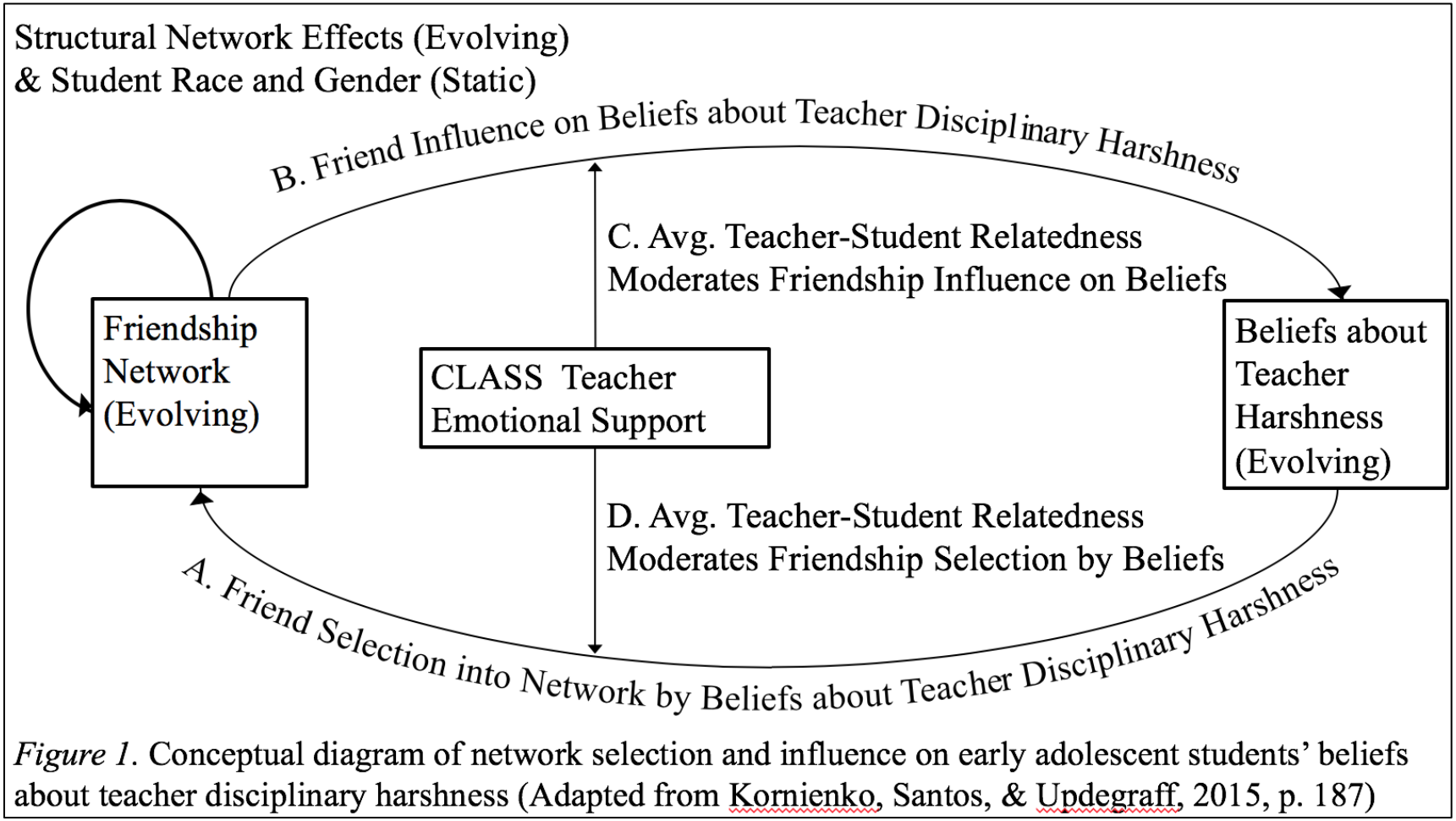


Figure 1. Conceptual diagram of network selection and influence on early adolescent students' beliefs about teacher disciplinary harshness (Adapted from Kornienko, Santos, & Updegraff, 2015, p. 187)

Hypotheses

For our first research question, we hypothesized that there is homophily regarding beliefs about the teacher across all three teaching practices. For our second and third research questions, we had a distinct hypothesis for student perceptions of autonomy-controlling practices (i.e., disciplinary harshness) versus autonomy-supportive practices (teachers promoting voice and choice and fostering relevance).

Beyond our hypothesis related to homophily beliefs among friends and that this looked different based on classroom emotional support, we had few hypotheses related to the nature of these classroom differences. Yet, these hypotheses are general, and our analyses related to the nature of classroom differences were somewhat exploratory. For student perceptions of teacher disciplinary harshness, we hypothesized that across classroom homophily of beliefs was shaped by students forming friends with similar beliefs rather than maintaining friendships. We also hypothesized that students would influence their classmates' beliefs about disciplinary practices. While we believed these trends for autonomy-controlling practices are universal across classrooms, we also postulated that peer selection and influence processes would be more salient in classrooms with low observed emotional support than in classrooms with high emotional support. This hypothesis was based on findings related to emotional support being one aspect of social management dynamics, and peers would play a less pronounced role in classrooms where teachers are observed as demonstrating greater support towards the class.

For student perceptions of teachers providing voice and choice and fostering relevance, we hypothesized that classrooms would vary to such a great extent that we would see distinct patterns of homophily emerge for low emotional support classes and high emotional support classes. While we had the hypothesis that classrooms would show different patterns of homophily, understanding the nature of the underlying mechanisms for these two constructs was largely exploratory.

Method

See Chapter 3 for Participants, Procedures, and Measures Besides the CLASS

Procedure and Participants for the CLASS

Data were collected as part of a larger longitudinal study examining early adolescent social and academic adjustment in school. Schools were recruited from three school districts located in small urban communities in the Midwest. To provide a common reference point across the different school settings, we focused on the classroom context in the domains of math and science. Prior work (Allen et al., 2013) found that the CLASS was related to gains in math and science achievement similarly, providing support for including both subjects. All math and science teachers in the 6th grade at the middle schools agreed to participate and we chose one of their classes to observe and administer surveys. For the teachers from the feeder elementary schools, we aimed to focus on math or science in equal proportions.

Observations were conducted in October and November. As the school year commenced in mid-August in these school districts, this was about two or three months into the school year. Research assistants scheduled classroom observations on days that

the teachers deemed "typical" days of math or science instruction. About a week or two following observations, two trained research assistants administered surveys to students in their classrooms. Four classrooms did not complete the student survey aspect of the project due to scheduling conflicts and were not included in our study.

The Upper Elementary Version of the CLASS certification (grades 4-6; Pianta, Hamre & Mintz, 2010) was obtained by our six classroom observers; the Collaborative Institutional Training Initiative (CITI) Human Subject Protection trained university researchers. Certification on the CLASS observation protocol meant that all six coders had to achieve at least 80% correct on the test at the end of the CLASS course. To obtain this, score codes must be within one point (on a seven-point continuum) from what the developers consider the correct code when coding segments of videos of classrooms. Furthermore, 20% of the classroom observations in our sample were conducted in pairs. When we employed the same criteria in the field as the CLASS certification test, 94% of the time our observation pairs were coded within one point of each other.

CLASS Observed Teacher Emotional Support. The CLASS is a well-established observational measure of teaching practices in the classroom (Pianta, La Paro & Hamre, 2008). The CLASS is comprised of three domains, and our study used the domain of Emotional Support. Emotional Supports ($\alpha = .83$) contains three dimensions of *Positive Climate* (relationships, affect, respect, communication), *Negative Climate* (punitiveness, sarcasm/disrespect, negativity), *Sensitivity* (awareness, responsiveness, action to address problems, comfort), and *Regard for Student Perspectives* (flexibility, support for autonomy, connections to current life, and meaningful peer interactions).

In order to assess CLASS emotional support as a moderator, we created these three groups since the Simulation Investigation for Empirical Network Analyses (SIENA) do not have the functionality to account continuous classroom-level scores that are not directly related to nominators (Ripley et al., 2020). We made a distinction between classrooms with high, moderate, and low emotional support) based on their score for emotional support. We used the same approach as Laninga et al.'s (2018) study, where classes were divided by 1 SD below and above the mean. Classes with *low emotional support* were those that scored 1 standard deviation (low classroom emotional support, n=11, M=3.36). Classrooms with *high average* perceptions of observed teacher emotional support those that scored 1 standard deviation higher than the average of all classroom scores of emotional support (low classroom emotional support, n=11, M=5.57). All remaining classrooms were classified as *moderate average* perceptions of observed teacher emotional support, M=4.40, n=24). Unlike, student reports of teaching practices on a 5-point scale, teachers were rated by external observers on a 7-point scale.

Analysis of Strategy

Longitudinal Social Network Analyses. We estimated friendship selection and influence processes with stochastic actor-based models using RSiena software program (SIENA 3.6 R version Rsiena 1.2-23; Ripley et al., 2020). RSiena program software estimates to what extent similarity among friends' disciplinary harshness is due to friendship selection, maintenance, and influence processes (Steglich, Snijders & Pearson, 2010) while controlling for structural network effects and the overall development of student perceptions of teacher disciplinary harshness, promoting voice and choice, and fostering relevance in the network (further explained above in Table 2.1).

Model specification for network structures. To understand changes in students' friendships at the same time as students' beliefs about teacher autonomy-supportive practices, we first needed to account for or control several common network structures. Thus, we accounted for several network structures commonly used across studies using stochastic actor-based models, specifically the following six network parameters: outdegree (density), reciprocity, transitive triplets, 3-cycles, indegree – popularity, and outdegree – activity. See Table 2.1 for a description of parameters used to assess various network structures across our models. [Snijders et al. outline these six parameters to include accounting for network structures for all analyses].

For example, classrooms in which there are more friendship ties overall (density) or the extent to which students nominate each other back as friends (reciprocity) play a role in students' homophily perceptions of teaching practices. Thus, if we control for the effects like reciprocity of friendships (student A nominating student B increases the likelihood student A nominates student A back) within classrooms, then we are accounting for friendship patterns that otherwise could be used to explain away our hypotheses that friends are similar to each other in their beliefs about perceptions of teaching practices.

Table 2.1

Interpretation of the Parameters used in the Current Study (Study 2) Replicated from Laninga-Wijnen's (2017, p. 1283) Appendix

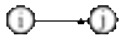
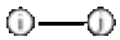
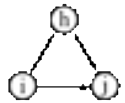
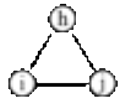
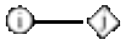
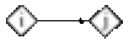
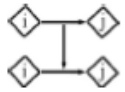
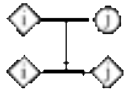
Term for parameter in current study	SIENA term	Conceptual meaning	Graphical representation
Descriptive			
Average number of friends	Average outdegree	Average number of friends	
Cohesion in friendship network	Density	Total number of friendship ties divided by the total number of possible friendship ties	
Proportion reciprocated friendships	Reciprocity	Proportion of reciprocated relationships within the friendship network	
Proportion triadic friendships	Transitivity	Proportion of transitive relationships within the friendship network	
Average number of friendship changes	Hamming Distance	Average number of friendship changes from one time point to the next	
Proportion of stable friendships	Jaccard index	The proportion of stable friendship relations out of the total number of created, resolved, and stable friendship	
Structural Network Dynamics			
Tendency to make friends	Outdegree	Tendency to have friends at all	
Reciprocated friendships	Reciprocity	Tendency to form reciprocated relationships	
Transitive group formation	Transitive triplets effect	Tendency toward network closure (friends of my friends are my friends). Transitive triplets are hierarchical in nature	
Cyclical group formation	3-cycles effect	Tendency toward forming three-cycles, which is the simplest form of generalized exchange and is opposed to hierarchy	

Table 2.1 continued

Interpretation of the Parameters used in the Current Study (Study 2) Replicated from Laninga-Wijnen's (2017, p. 1283) Appendix

Term for parameter in current study	SIENA term	Conceptual meaning	Graphical representation
Selection Dynamics			
Effect of achievement on friendship nominations received	Alter Effect	Tendency of adolescents to select high-achieving peers as friends	
Effect of achievement on friendship nominations given	Ego Effect	Tendency of high-achieving adolescents to send friendship nominations	
Similarity-based selection of friends based on achievement	Evaluation similarity effect	Tendency for adolescents and friends to select each other based on similarity between the adolescents and friends in the independent variable (i.e., achievement).	
Maintenance Dynamics			
Similarity-based maintenance of friends	Endowment effect	Tendency for adolescents and friends to maintain each other's friendship based on similarity	
Influence Dynamics			
Friendship influence on achievement	Average similarity effect	Tendency of friends to become more similar in behavior over time: the friends' behavior predicts changes in the adolescents' behavior (i.e., achievement)	

SIENA = Simulation Investigation for Empirical Network Analyses.

Model specification same-belief selection effects. We examined the extent to which friendship selection was related to students' beliefs about their teachers' autonomy-supportive practices using several estimated parameters. The "*effect of belief on friendship nominations received"* indicates whether adolescents who view their teachers as harsh (perceptions of high teacher disciplinary harshness) are more often nominated as friends. Conversely, the "*effect of belief on friendship nominations given"* indicates whether adolescents who report high levels of teacher autonomy-supportive practices tend to *give* more friend nominations to peers. We also estimated the quadratic functions of these estimates (EgoSqX and AltSqX). By including these effects, the parameter "*similarity-based selection"* (ego*alter) for high levels of disciplinary harshness provided reliable estimates for testing our hypothesis about the extent to which adolescents form new friendships with peers based on similarity in perceptions of teacher disciplinary harshness.

Model specification same-belief maintenance effects. We examined to what extent similar beliefs about teacher autonomy-supportive practices predicted that a friendship present at one measurement would still be present at the next measurement (using endowment effects). A positive parameter for similarity-based maintenance of friends indicates that similarity in aggressive and prosocial beliefs predicts friendship maintenance.

Model specification same-belief friendship influence. The friendship belief dynamics of the model consisted of several control effects (see Table 2.1). Friendship influence processes were measured with the average sim parameter, which estimates

whether adolescents with similar perceptions of teacher autonomy-supportive practices were similar among adolescents and their classroom friends. Hence, this represents adolescents' tendency to develop beliefs that are more similar to their friends' beliefs. These friendship influence effects can be in an upward or a downward direction, or remain similar, depending on the strength of their friends' beliefs.

Results

Preliminary Analyses

Description of the network and individual variables are presented in Table 2.2 for classrooms distinguished based on teacher emotional support as assess using the CLASS observation scoring protocol. Preliminary analyses indicated that the results were similar for high and low observed emotional support classrooms. First, we found no significant differences between network processes in high and low observed emotional support classrooms, with the exception of a greater number of friends nominated in classrooms with high and moderate teacher emotional support. The one notable difference between classrooms with high and low observed emotional support was that there were a greater number of overall changes in friendship.

In one case, one class was omitted from the multi-group analyses in order to get desirable convergence, which did not affect the interpretability of results. For all auxiliary statistics in all classrooms, the goodness of fit was acceptable or good for student perceptions of disciplinary harshness. This was indicated by fit as indicated by violin plots indicating that the simulated values did not depart too far from the observed values and a nonsignificant Mahalonis distance. There were some modest fit issues with goodness of fit for teacher promoting voice and choice, namely for the classrooms that

were low in teacher emotional support. Due to issues with convergence, which may be an indicator of a poor fitting model, we did not interpret the findings for student perceptions of teacher relevance. Moreover, based on our Moran's I, our indicator of autospace correlations between perceptions and friendships values without accounting for network effects, there was not patterns of similarity or dissimilarity among students' friendships based on their perceptions of teacher relevance. Given these preliminary findings and goodness of fit test, our longitudinal social network analyses focused on student perceptions of teacher disciplinary harshness and promoting voice and choice, and teacher fostering relevance is not included in subsequent analyses.

Table 2.2

The Role of Observed Classroom Emotional Support in Changes in Friendship Networks and Student Perceptions of Autonomy-Supportive Teaching Practices

	High in Observed CLASS Emotional Support, Mean (SD)		Moderate in Observed CLASS Emotional Support, Mean (SD)		Low in Observed CLASS Emotional Support, Mean (SD)	
	Fall	Spring	Fall	Spring	Fall	Spring
Friendship Network						
Average number of friends (Outdegree)	4.73 (1.08)	4.58(1.33)	5.17(1.48)	5.01(1.49)	4.54(.92)	4.56(.95)
Number of friendship ties or nominations	97.55 (32.17)	95.91(41.58)	104.35(43.15)	102.26(45.97)	85.64(28.38)	82.09(33.72)
Cohesion in the friendship network (Density)	.25 (.06)	.24(.06)	.28(.07)	.27(.06)	.27(.08)	.26(.05)
Proportion reciprocated friendships (Reciprocity)	.40 (.11)	.37(.13)	.40(.08)	.42(.180)	.39(.09)	.37(.07)
Changes in Student Perception	W1-W2		W1-W2		W1-W2	
Teacher Disciplinary Harshness						
Fraction increased students	25%		24%		20%	
Fraction decreased students	22%		30%		40%	
Fraction stable students	53%		46%		40%	
Teacher Promoting Voice & Choice						
Fraction increased students	27%		35%		39%	
Fraction decreased students	28%		26%		25%	
Fraction stable students	45%		39%		36%	
Teacher Fostering Relevance						
Fraction increased students	32%		32%		43%	
Fraction decreased students	22%		27%		23%	
Fraction stable students	45%		40%		35%	
Changes in Friendship Network						
Average number of friendship changes per classroom (Hamming Distance)	82(24.00)		82(36.92)		69(24.24)	
Proportion stable friendships (Jaccard Index)	.39(.09)		.43(.09)		.43(.09)	
Friendships emerged	39.50(18.28)		39.95(21.68)		35.45(16.63)	
Friendships dissolved	41.11(14.30)		42.04(18.97)		33.55(11.80)	
Friendships maintained	54.31(25.67)		62.30(28.82)		52.09(21.28)	
N classes	11		24		11	
N students (Including missing at one of both time points)	224		452		207	

Note. N classes = 46; N students = 879.

Longitudinal Social Network Analyses Stochastic Actor Based Models

Network Structures

For our structural network parameters, all network effects were significant; see Table 2.1 for further explanation of these network effects.

Friendship Homophily by Student Perceptions of Teaching Practices

Teacher Disciplinary Harshness. In Table 2.3, Model 1 shows our findings related to all 46 classrooms in our sample. We found that students selected classroom friends with similar views of disciplinary harshness. This was due to "creation" or students forming new friendship ties from fall to spring with classmates who shared their beliefs about teacher disciplinary harshness (or lack thereof). We did not find that similarity in perceptions of peers is related to the maintenance of friendships based on this belief. Furthermore, students do not influence their classroom friend perceptions from fall to spring. We also found that students who perceive greater disciplinary harshness nominate more classroom friends.

Second, Table 2.3 Models 2-4 show our findings for homophily of perceptions of teacher disciplinary harshness different levels of observed CLASS emotional support (high support, moderate support, and low support.). Our hypothesis confirmed that there are similar patterns across each group. In classrooms with high emotional support, students were more likely to form friendships with classmates who have similar beliefs about teaching practices than in low emotionally supportive classrooms. There were no significant differences between network or homophily effects in classrooms with low emotional support than classrooms observed with high emotional support. When looking at between-group differences, there was a non-significant pattern that peer influence of

perceptions of teacher disciplinary harshness is more pronounced in classrooms with low emotional support.

Table 2.3

RSiena Meta-analyses of Network and Behavior Dynamics for Perceptions of Teacher Disciplinary Harshness with CLASS Observed Classroom Emotional Support as a Moderator

	All 46 Classrooms		High in Observed CLASS Emotional Support		Moderate in Observed CLASS Emotional Support		Low in Observed CLASS Emotional Support		Comparison of High & Low Emotional Support
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	T-Test
Network Characteristics									
Tendency to make friends (outdegree-density)	-1.39	0.08 ***	-1.73	0.18 ***	-1.33	0.11 ***	-1.30	0.17 ***	-1.76 †
Reciprocated friendships (reciprocity)	0.97	0.05 ***	0.83	0.10 ***	1.03	0.06 ***	0.93	0.09 ***	-0.72
Transitive group formation (triplets)	0.29	0.01 ***	0.35	0.03 ***	0.27	0.02 ***	0.30	0.03 ***	1.16
Cyclical group formation (3-cycles)	-0.22	0.02 ***	-0.20	0.04 ***	-0.22	0.02 ***	-0.26	0.04 ***	1.08
Indegree friendship - popularity	-0.02	0.01 *	-0.02	0.02	-0.01	0.01	-0.04	0.02 *	0.75
Outdegree friendship - activity	-0.04	0.01 ***	-0.04	0.01 ***	-0.04	0.01 ***	-0.03	0.01 **	-1.06
Selection Processes									
Effect of perceptions on friendship nominations received (alter)	0.01	0.02	0.05	0.08	0.02	0.03	-0.04	0.05	0.99
Effect of perceptions on friendship nominations given (ego)	0.07	0.02 **	0.02	0.07	0.09	0.03 ***	0.05	0.05	-0.32
Similarity-based maintenance/dissolving of friends (Endow)	-0.02	0.33	-1.55	0.86 †	0.54	0.40	-0.20	0.77	-1.18
Similarity-based selection/avoiding of friends (Creation)	1.03	0.37 *	3.06	1.08 **	0.32	0.44	0.97	0.88	1.51
Same gender (selection, 1= boy)	0.43	0.03 ***	0.55	0.07 ***	0.36	0.04 ***	0.47	0.07 ***	0.88
Same race (Black=1)	0.22	0.03 ***	0.19	0.07 **	0.24	0.04 ***	0.19	0.07 **	0.01
Same race (Latinx=1)	-0.06	0.04	0.07	0.10	-0.07	0.06	-0.09	0.08	1.32
Same race (Asian=1)	-0.01	0.04	0.02	0.07	-0.07	0.07	0.06	0.09	-0.36
Socialization (Influence) Processes									
Perception linear shape	-0.02	0.05	-0.20	0.13	0.09	0.09	0.02	0.09	-1.34
Perception quadratic shape	-0.07	0.07	-0.34	0.22	-0.21	0.11 †	0.08	0.10	-1.72 †
Friendship Influence on Student Perceptions (Avg Sim)	1.21	1.76	-1.36	2.12	-3.46	2.65	5.67	3.32 †	-1.79 †
Convergence Ratio	0.22		0.17		0.21		0.22		
n of classes	46		11		24		11		

Note. N classes = 46; N students = 879.

†p<.10, *p<.05, **p<.01, ***p<.001

Teacher Promoting Voice and Choice

As shown in Table 2.4 with our model for teachers promoting voice and choice for all 46 classrooms students select classroom friends with similar views of disciplinary harshness. However, while nearing convergence, Model 1 with all classes should not be interpreted due to the lack of convergence when examining classrooms. Our models with subsets of classrooms for high and low emotional support converged and had had goodness-of-fit.

Our models for high and low emotional support showed divergent patterns of peer selection, maintenance, and influence of processes in relation to student perceptions of teachers promoting voice and choice (see Table 2.3 Models 2 through 4). In classrooms with high emotional support, there was a non-significant trend in forming friendships with classmates with shared perceptions of the teacher. While there were not significant classroom patterns with low emotional support, there is a trend of maintaining friendships, unlike emotionally supportive classrooms. While classrooms with high and low teacher support look different, our t-tests comparing classrooms with the highest and lowest emotional support were not significantly different. Classroom with low emotional support had an especially high standard error for peer processes linked to student beliefs about teaching practices.

Table 2.4

RSiena Meta-analyses of Network and Behavior Dynamics for Perceptions of Teachers Promoting Voice and Choice with CLASS Observed Classroom Emotional Support as a Moderator

	All 46 Classrooms		High in Observed CLASS Emotional Support		Moderate in Observed CLASS Emotional Support **No Convergence!**		Low in Observed CLASS Emotional Support		Comparison of High & Low Emotional Support
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	T-Test
Network Characteristics									
Tendency to make friends (outdegree-density)	-1.40	0.11 ***	-1.64	0.17 ***	-1.37	0.11 ***	-1.21	0.25 ***	-1.43
Reciprocated friendships (reciprocity)	0.98	0.07 ***	0.86	0.09 ***	1.03	0.07 ***	0.96	0.12 ***	-0.62
Transitive group formation (triplets)	0.29	0.01 ***	0.35	0.03 ***	0.26	0.02 ***	0.32	0.04 ***	0.65
Cyclical group formation (3-cycles)	-0.22	0.02 ***	-0.20	0.03 ***	-0.22	0.02 ***	-0.27	0.05 ***	1.22
Indegree friendship - popularity a	-0.02	0.01 †	-0.02	0.02	-0.01	0.01	-0.04	0.02 †	0.69
Outdegree friendship - activity b	-0.04	0.01 ***	-0.05	0.01 ***	-0.03	0.01 ***	-0.03	0.01 **	-0.9
Selection Processes									
Effect of perceptions on friendship nominations received (alter)	-0.02	0.03	-0.08	0.07	-0.02	0.04	0.05	0.09	-1.12
Effect of perceptions on friendship nominations given (ego)	0.00	0.04	0.08	0.06	-0.03	0.04	0.07	0.14	0.05
Similarity-based maintenance/dissolving of friends (Endow)	0.83	0.49 †	-1.15	0.77	1.37	0.66 *	3.17	2.42	-1.70†
Similarity-based selection/avoiding of friends (Creation)	0.00	0.54	1.56	0.83 †	-0.46	0.70	-1.46	1.78	-1.70
Same gender (selection, 1= boy)	0.43	0.04 ***	0.53	0.07 ***	0.36	0.05 ***	0.50	0.08 ***	-1.70
Same race (Black=1)	0.21	0.04 ***	0.20	0.06 **	0.23	0.04 ***	0.20	0.08 *	-1.70
Same race (Latinx=1)	-0.06	0.05	0.05	0.09	-0.06	0.06	-0.09	0.09	-1.70
Same race (Asian=1)	-0.01	0.05	0.02	0.07	-0.07	0.07	0.08	0.12	-1.70
Socialization (Influence) Processes									
Perception linear shape	-0.23	0.07 ***	0.02	0.09	-0.36	0.08 ***	-0.12	0.15	0.81
Perception quadratic shape	-0.06	0.06	-0.08	0.16	0.04	0.07	-0.20	0.36	0.32
Friendship Influence on Student Perceptions (Avg Sim)	3.38	1.59 *	3.28	1.79 †	6.31	2.19 **	-3.21	5.52	1.12
Convergence Ratio	0.44		0.19		0.34		0.13		
n of classes	46		11		24		11		

Note. N classes = 46; N students = 879.

†p<.10, *p<.05, **p<.01, ***p<.001

Teacher Fostering Relevance

Lastly, our models for friendship homophily based on selection, maintenance, and influence of perceptions about the teacher did not converge and were extremely poor fitting. When examining classrooms with high, moderate, and low emotional support, we also did not have a good-fitting model. Given these findings, there is little to no support for homophily beliefs about teachers fostering relevance.

Friendship Processes Related to Student Gender and Race

Overall, students selected friends of similar race and gender (see Table 2.3 and 2.4). This trend was among Black and White student populations as there were often none or only one student in a classroom who identified as Latinx or Asian. When looking at marginal racial trends in who receives nominations, our descriptive data reveals that White students receive slightly more nominations, perhaps due to being the majority group in nearly all classrooms.

Lastly, we conducted additional data on additional friendship selecting and influence processes related to race and gender. Supplemental analyses revealed that neither girls nor boys received more nominations for friendships (alter) or reported making more friends, though girls sent slightly more nominations than boys (ego). There were also no patterns of a particular racial group giving or receiving more nominations than another peer group, despite homophily of race. For our main analyses, we removed race and gender effects that were not significant due to these effects contributing to a worse-fitting model, especially as these variables inhibited model convergence.

Discussion

There is limited research on what contributes to differences in how students within the same classroom perceive the climate, particularly teaching practices. This study examined whether students have similar beliefs about their teacher's autonomy-supportive practices as their classroom friends (i.e., homophily). We also investigated processes (selection and influence) to explain homophily based on beliefs about autonomy-supportive practices. We found that classroom friends shared similar beliefs about their teacher disciplinary harshness and that friendship selection was the driving force behind this homophily of student perceptions. Surprisingly, differences in average class-wide teacher emotional support were not related to homophily (neither significant selection, maintenance, nor influence patterns) based on disciplinary harshness. The current study is the first study to explore the effects of peer dynamics on how students perceive the classroom climate, specifically teacher disciplinary harshness.

Our findings support our first hypothesis that classroom friends have similar perceptions of their teacher's autonomy-controlling practice of disciplinary harshness. This finding builds upon prior work that found students share many attributes with friends, including physical characteristics (McPherson et al., 2001; Wimmer & Lewis, 2010), behaviors (Baerveldt, Völker, & Van Rossem, 2008; Gremmen et al., 2018), and beliefs (Shin & Ryan, 2014b; 2017). Prior work found that students specifically have similar academic adjustments as their friends (e.g., GPA, self-efficacy, intrinsic value, effortful behavior, and disruptive behavior; Ryan, 2001; Shin & Ryan, 2014a). Given that friendship and teacher disciplinary harshness are related to academic adjustment (Brock et al., 2008; Reyes et al., 2012), our hypothesis that these two predictors of adjustment

would be related to each other was confirmed. This finding was the catalyst for our second and third research questions (and hypotheses), respectively: 1) Do students form, maintain, or select friendships with peers who have similar beliefs about teacher disciplinary harshness? And 2) To what extent might the processes behind homophily of student beliefs about teaching practices relate to observed classroom emotional support?

For autonomy-supportive teaching practice, we could not test for student perceptions of teachers fostering relevance in relation to friendships due to model convergence issues, most likely to a poor model fit. Several attempts at a good-fitting model failed (see Snijders, 2019 for a description). When investigating the standard errors for classrooms high in emotional support the standard errors for selection, maintenance, and influence effects were very high.

Overall, our findings support that high teacher emotional support may drive shared beliefs of teacher disciplinary harshness (or lack thereof) through the formation of friendship to classmates with shared beliefs and not the maintenance of friends with similar beliefs. In contrast, no significant pattern existed for low classrooms with observations of lower teacher support. Ruzek et al.'s (2016) findings suggest that teachers who are more emotionally supportive may support greater relatedness within the classroom, which may be linked to opportunities for students to interact more with peers overall in such classrooms.

One notable finding, distinct from our final hypothesis, was that the selection of friends with similar beliefs about the teacher still holds even when accounting for shared characteristics of gender and race among friendship networks. While unexpected, this finding opens the possibility for two directions of research: 1) exploring the extent to

which other common student characteristics may be linked to friendship selection and perceptions of differential disciplinary practices aside from race and gender, and 2) exploring the extent to which common classroom characteristics may be linked to friendship selection and differential disciplinary practices. Before reviewing the remaining findings, below we discuss the implications for future research given these two directions.

First, students may select friends based on several other qualities aside from race and gender, and these are also linked to student perceptions of teacher disciplinary harshness (e.g., students' shared self-belief, achievement, income, and behavior simultaneously predict friendship, and the impressions students form in classrooms). Specifically, students select friends with similar self-efficacy to their own (Shin & Ryan, 2014a), with similar levels of bully victimization (Lodder et al., 2016), delinquency/externalizing behavior (Franken et al. 2016), and achievement (Gremmen et al., 2017). Each of those characteristics or behaviors associated with friendship selection may also be linked with how students experience disciplinary harshness. Prior literature points to perceptions of the environment also being due to students' views of their behavior and motivation within a given context (Hughes, 2011; Hughes & Cao 2018; Ruzek & Schenke, 2018). Since selection played a greater role in perceptions of teachers rather than maintenance or influence—as was the case in studies of academic adjustment (e.g., Shin & Ryan, 2014a), there may be something unique about perceptions of teachers that aligns more to selection than other beliefs that are shaped more by influence.

Second, there may have been classroom processes not linked to students' traits or behavior that led to shared perceptions and friendship formation. For example, the seating

arrangements put in place by teachers at the start of the year may foster friendships and common experiences with disciplinary practices. There are many reasons students may become friends with those who hold similar views about their teacher, which may be worth investigating in future studies (van den Berg et al. 2012). Nonetheless, the formation within classrooms of peer groups who hold shared perceptions suggests that there might be "sub-climates" within the larger classroom climate. In contrast, the variance in perceptions of beliefs about the teacher goes beyond individuals to include groups with similar views and experiences related to their teacher.

Given our hypotheses, some of our findings were surprising. It was unexpected that students did not influence their friends' beliefs about teacher autonomy-controlling practices. The absence of a pattern especially was unexpected, given our hypothesis that peer influence would be the primary driver of homophily (shared perceptions of teacher disciplinary harshness) rather than peer selection. Despite prior work on how peers in workforce settings influence each other's perceptions about authority figures (Jones & Skarlick, 2005), we did not find such patterns. The timing of our data collection may have played a role in this unexpected finding. Students may be forming their perceptions about their teachers' autonomy-supportive practices relatively early in the year and maintaining their beliefs about disciplinary harshness throughout the remainder of the year. It is worth noting that Jones and Skarlicki's (2005) study was done using a series of lab studies and scenarios. It is likely that during the first few weeks of school, students were simultaneously establishing new friendships in the classroom and forming their impressions of the classroom climate, including their beliefs about the teacher. Given these findings, efforts to change student perceptions of the classroom climate should

target both students and teachers, focusing at the beginning of the school year when students form their perceptions.

Moreover, it was also unexpected that we did not find significant differences between high and low observed teachers' emotional support. These findings are inconsistent with growing evidence that teachers play a role in shaping peer dynamics within their classrooms—called social management dynamics (Farmer et al., 2018). However, we did see some notable trends within the data. High standard error and prior theory suggest that other observed aspects of the classroom, such as the amount of teacher-facilitated interaction, may be better indicators than overall emotional support.

According to Farmer and his colleagues, teacher practices relating to students could support a climate of enhancing peer dynamics. Our results might differ from prior work because Farmer et al. (2011; 2018) used school-wide interventions that involved teacher reflection, coaching, and team discussion in developing their skills for social management dynamics. In contrast, the present study investigates common teacher practices suggested to shape peer processes in the classroom. While these findings were somewhat unexpected, prior literature suggests that social management dynamics require additional tools and practice beyond classroom management or forming a positive climate more broadly (Hamm et al., 2011; Motoca et al., 2014). Farmer and his colleagues (2014) state, "teachers may need the training to incorporate social dynamics management into their daily instructional and classroom management approaches" (p. 6). While Farmer and his colleagues briefly outline what social management dynamics look like, few studies have tested specific teaching practices (as opposed to school-wide interventions).

One study found that seating students who did not like each other were placed closer to each other resulted in higher likeability ratings and less bullying for children who were perceived most negatively at the start of the school year (van den Berg, Segers, & Cillessen, 2012). We recommend future research accounts for the potential mechanisms—teacher factors (e.g., seating arrangements) or student factors (e.g., student disruption)—that could explain why friends might share common beliefs about teacher disciplinary harshness. We also suggest that subsequent studies replicate this work with a larger sample of classrooms (e.g., those that allow comparison with more than 11 classrooms in the high and low observed teacher emotional support).

It is also worth discussing a few additional findings tangentially related to our core research questions. Interestingly, we found that in classrooms with low teacher emotional support, students who view the teacher as harsh received significantly more friendship nominations but nominated fewer students as friends. Perhaps a silver lining to low teacher emotional support is that students with disruptive behavior and negative views of climate are embraced and not rejected by peers (i.e., a greater number of peer nominations) than classrooms with higher teacher emotional support. While most students tend to thrive in classrooms with high emotional support, future studies may examine the social cost for students' when their views of the teacher are different from classmates. Our work builds on prior work to understand the importance of classroom friends for students' academic experiences.

Strengths and Limitations

The present study has several strengths and limitations worth reviewing. Among its strengths, our sample of students came from diverse socioeconomic backgrounds and

included large samples of White and Black students. The diversity of our sample allowed us to assess peer friendships as they related to racial differences. There are limitations in the number of Latinx and Asian American students in our sample, which is an important direction for future research. It is important to note that even when controlling for racial and gender homophily, students still selected friends based on disciplinary harshness. More work is needed to understand the extent to which homophily based on student race may interact with homophily based on student perceptions of teacher disciplinary harshness.

Another strength of our study was its use of peer nomination data and network analyses to understand the nature of friendships within classroom contexts. Moreover, our ability to collect network data at more than a one-time point during the school year allowed us to assess student friendship network structures while controlling for the larger network structures of the classroom. This method enabled us to use longitudinal network analysis approaches to understand changes in friendships alongside changes in student beliefs to make hypotheses about the role of friendships. However, future work should consider using Bayesian analyses for accounting for parameter differences across classrooms.

Furthermore, our study was not without limitations. Students' initial impressions of teacher quality somewhat matter for their perceptions over time (Reeve, Bolt, & Cai, 1999; Samudra et al., 2016). However, we did not collect data on students' initial perceptions of their teachers within the first few days or weeks of school. More work is needed on the nature of student friendship networks within the first week of the school

concerning students' earlier impressions of their teacher to understand whether peer influence may be occurring earlier than late October.

Another limitation was that our study took place over one year. Students develop their beliefs about disciplinary harshness often in the context of experience with prior teachers. Thus, an important direction for future research would be to understand how student perceptions of prior instructors shape student perceptions of disciplinary harshness. Students' prior classroom context, specifically teaching practices, play a role in students' experience of their current context and on academic adjustment (i.e., self-efficacy beliefs; Friedel, Cortina, Turner, & Midgley, 2010). The strength and limitation of our study was our sample size of 46 classrooms. When examining differences across classrooms, we had groups of 15 classrooms within each observed teacher's emotional support (high, moderate, and low). Thus, replicating our study with a greater number of classes in our high and low comparison groups may yield more robust findings. Nonetheless, having students' reports of their friendship ties at two time points during the year in conjunction with student beliefs about their context was a strength of the dataset.

Conclusion

Across all classrooms, students formed friendships based on beliefs about their teachers from fall to spring. Still, students did not influence their friends' perceptions about autonomy-supportive teaching practices after accounting for other peer dynamic structure effects, race, and gender homophily). Surprisingly, we did not find significant differences in these processes based on average teacher emotional support. The lack of difference between classrooms in teacher emotional support may be due to a range of factors, such as students experiencing similar treatment by the teacher or sharing

attribution styles (Graham & Taylor, 2016). Of all the aspects of their profession, teachers feel the least effective at managing peer dynamics (Ryan et al., 2015). This work aims to contribute to understanding how teachers and peers may collectively shape students' views of the class disciplinary climate (Brand et al., 2003; Heilbrun, Cornell & Konold, 2018).

Chapter 6: Classroom Norms and Peer Perceptions

During early adolescence, the classroom social context created by peer interactions can shape individual students' academic beliefs and behaviors. While "peer pressure" has been a common notion in more mainstream discussions, there is little to no empirical evidence that peers coerce fellow students; rather, students voluntarily adopt the beliefs of fellow students or model their classmates (Brown et al., 2008; Prinstein & Dodge, 2008). Peer norms reflect the acceptable and expected beliefs and behavior of group members within the classroom social context (Dijkstra & Gest, 2015). There is growing attention to how these classroom peer norms shape students' social and academic beliefs and behavior. According to Latané & Wolf (1981), organizational norms, in our case classrooms, are formed based on three main factors: 1) the number of individuals who endorse a certain belief (and the degree of that belief), 2) the power of the individuals who hold the beliefs, and 3) the proximity and frequency of interactions among individuals who hold the beliefs.

Two common peer norms examined in the literature are descriptive norms and status norms. Descriptive norms are beliefs or behavior that are most common to all students (Wright, Giammorino, & Parad, 1986). For example, Laninga-Wijnen et al. (2018) found that classroom profiles of average classroom aggressive and prosocial behavior at the beginning of the school year (descriptive norms) predicted individual aggression and prosocial behavior.

Status norms are beliefs and behaviors of those who have the highest status or

popularity within a classroom (Henry, 2000). For example, Rambaran (2013) found that status norms of risk-taking beliefs (i.e., classrooms where popular peers held a positive attitude towards risky behavior) were related to increased positive attitudes towards risk-taking among students in the class. However, they found descriptive norms did not predict risky behavior. According to Laninga-Wijnen et al. (2018), the core difference between these two peer norms is that "the descriptive norm approach places equal weight on the behavior of all peers in a given setting, the status norm approach holds that popular adolescents especially seem to influence which behaviors are seen as valuable" (p. 180).

While there has been evidence that descriptive and status norms influence many aspects of student behavior (Koth, Bradshaw, & Leaf, 2008; Laninga-Wijnen et al. 2018; Rambaran, 2017; Sentse et al. 2007; 2015), prior work has largely looked at peer norm effects on social behavior. The role of peer norms for student academic or achievement beliefs and behavior is not well understood (Bardach et al. 2020; Laninga-Wijnen et al. 2019; McKellar, in press). One challenge of assessing peer norms in the classroom is the extent to which different aspects of the classroom interact with each other to predict academic-related beliefs and behavior (Laninga-Wijnen et al., 2019; Rambaran, 2013). Peers, teachers, and individual factors shape one another. For example, teacher-liking and perceived teacher-liking of students predicted students' peer relationships and their social status among peers (Davis & Lease, 2007; Hendrickx et al., 2016; Sette et al., 2019). Davis and Lease's work also found that the perceptions of peers (specifically that of teaching-liking) predicted subsequent teacher-student quality interactions as indicated by teachers. This prior work suggests that peer interactions may play a role in student-

teacher relationships and perhaps how students view their teachers and the classroom climate in general.

One of the most common ways we assess classroom climate is through average student perceptions of teaching practices, a peer descriptive norm of perceptions. Does this classroom descriptive norm affect individual perceptions of the teacher over the school year? To what extent do status norms also play a role, if any? Explicitly examining the role in which peer norms shape changes in individual perceptions and identifying a typical measure of "classroom climate" supports the ability to bridge the literature focused on classroom context and the literature focused on peer context.

Fauth et al. (2019) assessed periods or classes of students who shared a group of teachers and compared how these different groups of students viewed the same teacher as well as differences across teachers. They found that similarity in student reports of classroom management between teachers only occurred because they taught the same group of students.

Along with empirical support for shared perceptions based on group norms, there is theoretical support that both peer norms (descriptive and status) play a role in individual classmates' beliefs and behaviors. For descriptive norms, the person-group similarity model posits that the social acceptance (or rejection) of having a certain belief is reinforced by the frequency of the belief among classmates (Boivin et al., 1995). This model is also referred to as the social context or social misfit model (Chang, 2004; Wright et al., 1986). Moreover, the way we assess classroom climate is a descriptive norm of student perceptions (Downer et al., 2015; Marsh, 2012). Numerous studies have investigated average classroom perceptions of peer descriptive norms of perceptions

above and beyond individual perceptions (e.g., Aldrup et al., 2018; Cipriano et al., 2018; Dijk, Gage, & Grasley-Boy, 2019; Koth et al., 2008; Lau & Nie, 2008; Morin et al., 2014; Hospel & Garland, 2016). All studies have found significant classroom-level effects from averaging student perceptions together on a dependent variable of student outcomes when controlling for prior average perceptions is measuring a peer descriptive norm of perceptions. Based on this prior work, descriptive norms may predict changes in individual student perceptions of teacher autonomy-supportive practices.

For status norms, Bandura's (1986; 2001) social learning theory posits that individuals only model the behaviors and adopt the beliefs of valued referents. The existence of status norms is based on the notion that not all students are equally influential within classrooms and that some have more power than others (Gibbons & Gerrard, 1995). Thus, behaviors and beliefs that are enacted by students with status within classrooms at the beginning of a school year may become valuable for changes in students' individual beliefs over the year according to goal-framing theory (Hartup, 1996; 2001; Haselager, Hartup, Van Lieshout & Riksen-Walraven, 1998). Lindenberg's goal-framing theory claims that individuals only focus on information related to their goals. LaFontana and Cillessen (2010) argue that adolescents prioritize achieving status in their choices, attitudes, and behavior related to friends. Adolescents also avoid classmates with low status to obtain a higher peer status (Lindenberg, 2006) and to evade being the targets of bullying (Hopmeyer, Gorman, Schwartz, Nakamoto, & Mayeux, 2011).

Taken together, popular peers may be powerful influencers of how their peers view teaching practices. There is empirical evidence supporting the claim that both descriptive norms and status norms influence individual students' beliefs (Cillessen &

van den Berg, 2012; Rodkin & Ryan, 2012). But do these norms apply to student perceptions of teaching practices? And how might each norm be related to the others? In a study examining both descriptive and status norms within classrooms, Laning-Wiijen et al. (2018) found classroom descriptive norms predict individual student behavior over the school year. However, they also found that status norms change across the school year and differ greatly based on the kind of behavior that is the norm (e.g., status norms mattered for aggressive behavior and not for prosocial behavior). Unstable independent variables logically cannot be very influential for development over time. While related to classroom behavior cross-sectionally, we may expect similar findings to Laning-Wiijen et al. for student perceptions of teaching practices from fall to spring.

It might be helpful to outline a scenario illustrating descriptive and status norms on student perceptions of teaching practices. For descriptive norms, imagine a student, Amanda, who feels that her math teacher, Ms. Meyers, is demanding, interesting, and has fair expectations. However, most of her classmates feel it is a boring class and that the teacher is overly strict. By the spring, Amanda's behaviors and perception of the class may reflect that she has adopted some of her peers' beliefs. For status norms, imagine that the same student, Amanda, is in Ms. Meyers' class, and many students share her views. However, the "cool" girl in Amanda's math class thinks Ms. Meyers is completely unfair and boring. Over time, Amanda and others might adopt beliefs similar to these popular girls given their high status in the class. This study aims to position classmates' beliefs about the teacher as a factor related to peer norms to better bridge the work on teacher and peer relationships in the classroom. We specifically focus on descriptive and

status norms of three autonomy-supportive teaching practices: disciplinary harshness, promoting voice and choice, and fostering relevance.

Research Question:

1. To what extent do the classroom descriptive norms in the fall relate to how student perceptions of teaching practices change from fall to spring?
2. To what extent do the classroom status norms in the fall relate to how student perceptions of teaching practices change from fall to spring?
3. To what extent do the classroom descriptive and status norms in the fall relate jointly to how student perceptions of teaching practices change from fall to spring?

We apply these three research questions to each of our autonomy-supportive teaching practices.

Hypotheses

First, we hypothesized that peer descriptive norms for teaching practices would predict changes in individual perceptions from fall to spring for all three autonomy-supportive practices. Second, we hypothesized that status norms would predict individual perceptions of disciplinary harshness. We formed this hypothesis based on Laninga-Wijnen et al.'s (2019) observation that status norms were related to aggressive but not prosocial norms.

We do not have sufficient theoretical or empirical support to state hypotheses related to the status norms for promoting voice and choice and fostering relevance. When looking at both descriptive norms and status norms as simultaneous predictors of individual student classroom perceptions of teaching practices, we hypothesized that descriptive norms would be a stronger predictor of student perceptions in the spring when

controlling for fall perceptions. This hypothesis is based on descriptive norms playing a more influential role than status norms in Laninga-Wijnen et al.'s study.

Method

Data Analysis Plan

We used hierarchical linear modeling to examine the extent to which classroom descriptive norms (average classroom perceptions of teaching practices) and status norms (average student perceptions of the classroom correlated with their status within the classroom as nominated by their peers) predict student perceptions of teaching practices in the spring while controlling for fall perceptions. Specifically, we examined student perceptions of autonomy-supportive teaching practices (disciplinary harshness, promoting voice and choice, and fostering relevance) across the school year.

Our baseline model, Model 0, is the fully unconditional model. This model only includes student perception of spring teaching practices as the outcome, providing information about the intraclass correlation in the spring, i.e., the proportion of variance accounted for by the between-student variance and the between-classroom variance.

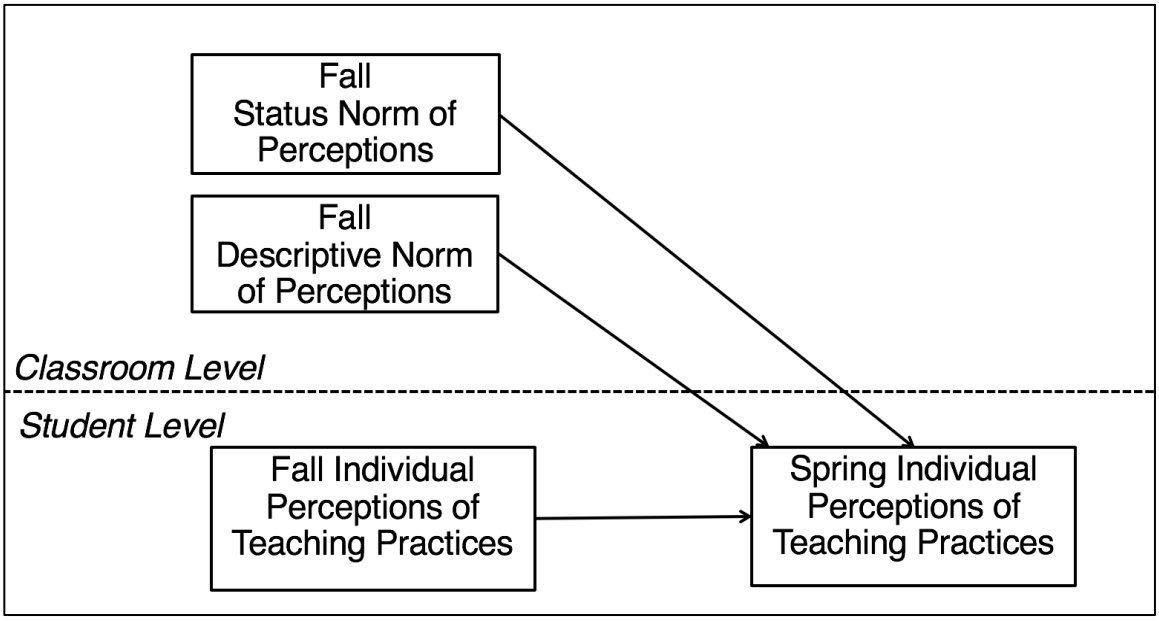
In Model 1, we included fall student perceptions of teaching practices as a predictor of spring student perceptions of teaching practices. For all subsequent models, we include fall student perceptions as predictors of spring perceptions of teaching practices to establish a change model. In Model 2, we examined fall classroom descriptive norms for student perceptions of teaching practices. In Model 3, we investigated fall status norms. In Model 4, we examined both descriptive norms and status norms simultaneously. We ran each of these models with and without controlling for prior individual fall perceptions for each autonomy-supportive teaching practice:

disciplinary harshness (Table 3.1 and Table 3.2), promoting voice and choice (Table 3.3 and Table 3.4), and fostering relevance (Table 3.5 and Table 3.6),

Chi-square difference tests were used to examine the improvement in model fit from Model 1 and Model 2. In addition to running these models for changes over time, we also ran cross-sectional models with fall descriptive and status norms predicting individual fall student perceptions of teaching practices.

Figure 3.

Two-Level Hierarchical Linear Model Assessing Descriptive and Status Norms of Spring Perceptions Accounting for Fall Perceptions



Results

Descriptive Statistics

See Study 1 for classroom descriptive statistics.

Multilevel Models of Classroom Peer Norms on Individual Perceptions

In Tables 3.1 through 3.6, all Models parallel one another with Model 0 as the fully unconditional model, Model 1 being the inclusion of fall perceptions, and Models 2 through 4 being the inclusion of classroom-level peer norms. Our findings for the effects of classroom-level predictors on spring engagement include fall individual student perceptions at Level 1 predicting spring student perceptions. Thus, for all mentions of our findings as predicting student perceptions, these predict fall perceptions when controlling for spring perceptions. Tables 3.1, 3.3, and 3.5 show models without student-level demographics, race and gender, and Tables 3.2, 3.4, and 3.6 parallel the prior models with the inclusion of demographic variables.

Controlling Practice: Teacher Disciplinary Harshness

In Table 3.1, our fully unconditional model, Model 0, showed significant variance at Level 2, with 21% of the variance in student perceptions of teaching practices in the spring accounted for by differences between classrooms and 79% accounted for by individual perceptions. In Model 1, the inclusion of fall perceptions of teaching practices accounted for around half of the classroom-level variance, and 52% of the total residual variance was attributable to changes from fall to spring.

As shown in Model 2, we found that descriptive norms of disciplinary harshness significantly predicted individual perceptions. Descriptive norms did not affect the slope or strength of the relationship between fall and spring. Status norms were not a significant direct predictor of perceptions, nor were they a predictor of strength between fall and spring perceptions (Model 3). When including both descriptive norms and status norms in the same model, the effects for descriptive and status norms show the same patterns.

As shown in Table 3.2, the models for classroom peer norms on disciplinary harshness show the same patterns when accounting for student demographics. Gender did not predict student perceptions of disciplinary harshness. Black students were more likely than their White peers to report teacher disciplinary harshness. Patterns were similar for Latinx students compared to peers from other racial groups; these differences were non-significant. Asian student perceptions of disciplinary harshness were not significantly different than other racial groups.

Table 3.1

Multilevel Regression Models Predicting Changes in Perceptions of Disciplinary Harshness Predicted by Peer Norms

	Null Model	(L1) Harshness (L2)	(L1) Harshness (L2) Descriptive Norms	(L1) Harshness (L2) Status Norms	(L1) Harshness (L2) Descriptive + Status Norms
	Model 0	Model 1	Model 2	Model 3	Model 4
	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	2.66(.08)***	2.65(.06)***	2.63(.06)***	2.64(.06)***	2.63(.06)***
Level 1 - Individual Level					
(L1) Individual Harshness Perceptions		0.65(0.07)***	0.63(.03)***	0.65(.04)***	0.63(.04)***
Level 2 - Classroom Level					
(L2) Descriptive Norms of Harshness			0.27(.12)*		0.26(.12)*
(L2) Status Norms of Harshness				0.13(22)	0.05(.22)
Cross-Level Interactions					
(L1) Individual Harshness Perceptions (L2) Descriptive Norms Harshness			0.08(.07)		0.04(.07)
(L1) Individual Harshness Perceptions (L2) Status Norms				0.20(.12)	0.19(.13)
Variance components					
(L2) Between Class (τ00)	0.27	0.14	0.13	0.13	0.12
(L1) Within Class (σ2)	1.03	0.69	0.68	0.69	0.68
Model Fit					
(L2) Chi-square	245.76***	192.14***	186.19***	185.08***	179.71
Deviance	2380.79	1939.36	1934.22	1935.02	1931.28
No. of Estimate Parameters	3	4	6	6	8
Model Comparison					
Model 0 comparison		441.43(1)***			
Model 1 comparison			5.14(2)†	4.34(2)	8.08(4) †
Model 2 comparison					2.94(2)

Note. Harshness or Harshness Perceptions = Student Perceptions of Teacher Disciplinary Harshness; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Table 3.2

Multilevel Regression Models Predicting Changes in Perceptions of Disciplinary Harshness Predicted by Peer Norms Accounting for Demographics

	(L1) Harshness + Demographics (L2)	(L1) Harshness + Demographics (L2) Descriptive Norms	(L1) Harshness + Demographics (L2) Status Norms	(L1) Harshness + Demographics (L2) Descriptive + Status Norms
	Model 1	Model 2	Model 3	Model 4
	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	2.58(.08)***	2.57(.08)***	2.58(.08)***	2.57(.08)***
Level 1 - Individual Level				
(L1) Gender	0.01(.06)	0.01(.06)	0.01(.06)	0.00(.06)
(L1) Black	0.14(.06)*	0.13(.06)*	0.13(.06)*	0.13(.06)*
(L1) Latinx	0.23(.14)†	0.22(.13)†	0.22(.13)†	0.22(.13)
(L1) Asian	-0.08(0.08)	-0.06(0.09)	-0.08(0.09)	-0.07(0.09)
(L1) Individual Harshness Perceptions	0.64(.04)***	0.61(.04)***	0.63(.03)***	0.62(.04)***
Level 2 - Classroom Level				
(L2) Descriptive Norms of Harshness		0.25(.12)*		0.21(.11)*
(L2) Status Norms of Harshness			0.17(.22)	0.09(.22)
Cross-Level Interactions				
(L1) Individual Harshness Perceptions (L2) Descriptive Norms Harshness		0.06(.07)		0.03(.06)
(L1) Individual Harshness Perceptions (L2) Status Norms			0.19(.12)	0.18(.13)
Variance components				
(L2) Between Class (τ00)	0.13	0.12	0.12	0.11
(L1) Within Class (σ2)	0.68	0.68	0.68	0.68
Model Fit				
(L2) Chi-square	184.51***	177.26***	177.31***	171.26***
Deviance	1898.42	1893.66	1894.54	1891.00
No. of Estimate Parameters	8	10	10	12
Model Comparison				
Model 1 comparison		4.76(2)†	3.88(2)	7.42(4)
Model 2 comparison				2.66(2)

Note. Harshness or Harshness Perceptions = Student Perceptions of Teacher Disciplinary Harshness; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Supportive Practices: Voice and Choice and Relevance

For student perceptions of teachers promoting voice and choice (Table 3.3, Model 0), we found significant variance at Level 2, with 18% of the variance in student perceptions of teaching practices in the spring accounted for by differences between classrooms and 82% of the variance was accounted for by individual perceptions. In Model 1, the inclusion of fall perceptions of teaching practices accounted for more than half of the classroom-level variance, and 39% of the total residual variance was attributable to changes from fall to spring. Our subsequent findings are explained in terms of accounting for the proportion of this residual change.

For fostering relevance (Table 3.4, Model 0), 15% of the variance in student perceptions was accounted for by classroom-level factors, and 85% of the variance was accounted for by student-level factors. The inclusion of fall perceptions of teaching practices, as seen in Model 1, accounted for about half of the classroom-level variance, and 47% of the total residual variance was attributable to changes from fall to spring. Our subsequent findings are explained in terms of accounting for the proportion of this residual change.

For both voice and choice (Table 3.2) and relevant instruction (Table 3.4), descriptive norms predicted individual student perceptions (Model 2), and status norms did not predict individual perceptions (Model 3). In both Model 4s, descriptive norms predicted student perceptions, and the addition of status norms had little to no impact on the overall model. For models with demographic variables (Tables 3.4 and 3.6), Asian students (6% of the total sample) perceived greater voice and choice and relevant instruction than White peers. Above and beyond prior perceptions, the inclusion

demographic variables accounted for little to no additional residual variance in any model.

Table 3.3
Multilevel Regression Models Predicting Changes in Perceptions of Teachers Promoting Voice & Choice Predicted By Peer Norms

	Null Model	(L1) Voice & Choice (L2)	(L1) Voice & Choice (L2) Descriptive Norms	(L1) Voice & Choice (L2) Status Norms	(L1) Voice & Choice (L2) Descriptive + Status Norms
	Model 0	Model 1	Model 2	Model 3	Model 4
	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	2.48(.07)***	2.48(.05)***	2.47(.05)***	2.48(.05)***	2.48(.05)***
Level 1 - Individual Level					
(L1) Individual Voice & Choice Perceptions		0.48(0.03)***	0.44(.04)***	0.48(0.03)***	0.44(0.04)***
Level 2 - Classroom Level					
(L2) Descriptive Norms Voice & Choice			0.43(.11)***		0.38(.11)***
(L2) Status Norms of Voice & Choice				0.26(.18)	0.08(.18)
Cross-Level Interactions					
(L1) Individual Voice & Choice Perceptions (L2) Descriptive Norms of Voice & Choice			0.06(.08)		0.10(.10)
(L1) Individual Voice & Choice Perceptions (L2) Status Norms				-011(.12)	-0.12(.15)
Variance components					
(L2) Between Class (τ00)	0.18	0.07	0.05	0.07	0.05
(L1) Within Class (σ2)	0.83	0.69	0.69	0.69	0.69
Model Fit					
(L2) Chi-square	216.01***	130.31***	99.24***	123.86***	100.14***
Deviance	2224.43	1934.33	1920.57	1930.57	1919.41
No. of Estimate Parameters	3	4	6	6	8
Model Comparison					
Model 0 comparison		290.10(1)***			
Model 1 comparison			13.76(2)**	3.76(2)	14.92(4)**
Model 2 comparison					1.16(2)

Note. Voice & Choice = Student Perceptions of Teachers Promoting Student Voice & Choice;; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Table 3.4

Multilevel Regression Models Predicting Changes in Perceptions of Teachers Promoting Voice & Choice Predicted By Peer Norms Accounting for Demographics

	Null Model	(L1) Voice & Choice + Demographics (L2)	(L1) Voice & Choice + Demographics (L2) Descriptive Norms	(L1) Voice & Choice + Demographics (L2) Status Norms	(L1) Voice & Choice + Demographics (L2) Descriptive + Status Norms
	Model 0	Model 1	Model 2	Model 3	Model 4
	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	2.47(.07)***	2.37(.07)***	2.34(.06)***	2.36(.07)***	2.33(.06)***
Level 1 - Individual Level					
(L1) Gender		0.08(.07)	0.09(.07)	0.08(.07)	0.08(.07)
(L1) Black		0.11(.07)	0.13(.06)	0.11(.07)	0.11(.07)†
(L1) Latinx		0.09(.14)	0.12(.14)	0.10(.14)	0.09(.14)
(L1) Asian		0.30(.14)	0.31(.13)*	0.31(.14)*	0.30(.14)*
(L1) Individual Voice & Choice Perceptions		0.46(.04)***	0.42(.04)***	0.46(.04)***	0.46(.04)***
Level 2 - Classroom Level					
(L2) Descriptive Norms Voice & Choice			0.46(.11)***		0.42(.11)***
(L2) Status Norms of Voice & Choice				0.28(.18)	0.09(.19)
Cross-Level Interactions					
(L1) Individual Voice & Choice Perceptions (L2) Descriptive Norms Voice & Choice			0.09(.07)		0.10(.10)
(L1) Individual Voice & Choice Perceptions (L2) Status Norms				-0.14(.13)	-0.14(.15)
Variance components					
(L2) Between Class (τ00)	0.18	0.08	0.04	0.07	0.04
(L1) Within Class (σ2)	0.83	0.82	0.67	0.67	0.68
Model Fit					
(L2) Chi-square	210.38***	131.24***	96.55***	127.54	86.38***
Deviance	2185.67	1847.25	1831.65	1845.99	1828.00
No. of Estimate Parameters	3	8	10	10	12
Model Comparison					
Model 1 comparison			15.60(2)***	*1.25(2)*	19.97(4)***
Model 2 comparison					4.37(2)

Note. Voice & Choice =Student Perceptions of Teachers Promoting Student Voice & Choice; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Table 3.5
Multilevel Regression Models Predicting Changes in Perceptions of Teacher Fostering Relevance Predicted by Peer Norms

	Null Model	(L1) Relevance (L2)	(L1) Relevance (L2) Descriptive Norms	(L1) Relevance (L2) Status Norms	(L1) Relevance (L2) Descriptive + Status Norms
	Model 0	Model 1	Model 2	Model 3	Model 4
	β(SE)	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	3.45(.07)***	3.44(.05)***	3.45(.05)***	3.44(.05)***	3.44(.05)***
Level 1 - Individual Level					
(L1) Individual Perceptions of Relevance		0.43(0.04)***	0.40(.04)***	0.43(.04)***	0.40(.04)***
Level 2 - Classroom Level					
(L2) Descriptive Norms of Relevance			0.43(.11)***		0.44(.10)***
(L2) Status Norms of Relevance				-0.01(.17)	0.08(.12)
Cross-Level Interactions					
(L1) Individual Perceptions of Relevance (L2) Descriptive Norms Relevance			0.02(.09)		0.02(.10)
(L1) Individual Perceptions of Relevance (L2) Status Norms				0.01(.13)	0.00(.14)
Variance components					
(L2) Between Class (τ00)	0.17	0.08	0.05	0.08	0.05
(L1) Within Class (σ2)	0.96	0.83	0.83	0.83	0.83
Model Fit					
(L2) Chi-square	181.53***	118.10***	94.08	118.08***	93.61
Deviance	2277.45	2006.56	1994.77	2006.56	1994.50
No. of Estimate Parameters	3	4	6	6	8
Model Comparison					
Model 0 comparison		270.89(1)***			
Model 1 comparison			11.79(2)**	0.01(2)	12.06(4)*
Model 2 comparison					0.27(2)

Note. Relevance = Student Perceptions of Teachers Fostering Relevance; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Table 3.6

Multilevel Regression Models Predicting Changes in Perceptions of Teacher Fostering Relevance Predicted by Peer Norms Accounting for Demographics

	(L1) Relevance + Demographics (L2)	(L1) Relevance + Demographics (L2) Descriptive Norms	(L1) Relevance + Demographics (L2) Status Norms	(L1) Relevance + Demographics (L2) Descriptive + Status Norms
	Model 1	Model 2	Model 3	Model 4
	β(SE)	β(SE)	β(SE)	β(SE)
Intercept	3.36(.07)***	3.36(.07)***	3.36(.07)***	3.36(.07)***
Level 1 - Individual Level				
(L1) Gender	0.04(.07)	0.04(.07)	0.04(.07)	0.04(.07)
(L1) Black	0.11(.08)	0.11(.08)	0.11(.08)	0.11(.08)
(L1) Latinx	0.09(.17)	0.08(.18)	0.09(.17)	0.08(.18)
(L1) Asian	0.24(.13)†	0.25(.13)*	0.24(.13)†	0.26(.13)*
(L1) Individual Perceptions of Relevance	0.42(.04)***	0.39(.04)***	0.42(.04)***	0.39(.04)***
Level 2 - Classroom Level				
(L2) Descriptive Norms of Relevance		0.44(.11)***		0.45(.11)***
(L2) Status Norms of Relevance			0.02(.18)	0.12(.13)
Cross-Level Interactions				
(L1) Individual Perceptions of Relevance (L2) Descriptive Norms Relevance		0.02(.09)		0.02(.10)
(L1) Individual Perceptions of Relevance (L2) Status Norms			0.01(.13)	0.01(.13)
Variance components				
(L2) Between Class (τ00)	0.09	0.06	0.09	0.05
(L1) Within Class (σ2)	0.82	0.82	0.82	0.82
Model Fit				
(L2) Chi-square	125.97	100.03***	125.97	99.18***
Deviance	1962.16	1950.41	1962.15	1949.94
No. of Estimate Parameters	8	10	10	12
Model Comparison				
Model 1 comparison		11.76(2)**	*0.02(2)*	12.23(4)*
Model 2 comparison				.47(2)

Note. Relevance = Student Perceptions of Teachers Fostering Relevance; β = Coefficient and SE = Standard Error; L1 = Level 1; L2 = Level 2. For all models, we centered L1 behaviors around the Grand Mean, used Full-Maximum Likelihood Estimates, and final estimation of fixed effects with robust standard errors.

†p<.10, *p<.05, **p<.01, ***p<.001

Cross-Sectional Models

When running cross-sectional models for Fall Descriptive Norms and Status Norms predicting individual engagement, we found that descriptive norms significantly and robustly predicted individual perceptions of teacher facilitation, relevant instruction, and promoting student voice and choice. The same patterns were seen for teacher disciplinary harshness but to a lesser extent. Given that our cross-section findings are parallel to the findings of our longitudinal analyses, we did not include these tables in the dissertation.

Discussion

The purpose of the current study was to assess the extent to which descriptive norms and status norms affect student perceptions of teaching practices over a school year. Overall, our findings suggest that descriptive norms, but not status norms, were linked changes in student perceptions of autonomy-supportive teaching. This was the case for all three autonomy-supportive constructs. These findings point to the strength of individual characteristics and of collective student experiences in the classroom in shaping individual student perceptions of the classroom climate. These findings also suggest the extent to which descriptive norms in perceptions within the first few weeks of school are salient for changes in perceptions over a school year.

Our findings for student perceptions of autonomy-supportive practices confirm our first hypothesis that descriptive norms predict changes in individual student perceptions. All three descriptive norms of autonomy-supportive practices were linked to individual perceptions in the spring after accounting for fall perceptions. These patterns

are similar to Laninga-Wijen et al.'s (2018) findings that classroom descriptive norms for student prosocial and aggressive behaviors at the beginning of the year predicted patterns for individual students over the year.

Our findings also provide evidence that teachers' behavior may primarily drive these peer norms as they are positioned as leaders of their classrooms. Nonetheless, by positioning the widely used measure of classroom climate (e.g., average student perceptions teaching practices) as a descriptive norm, this work may support efforts to bridge the literature on classroom climate and peer dynamics. This framing is important as teaching practices are informed by peer norms (Fauth et al., 2019), despite our findings that peers do not influence perceptions of teaching practices. Fauth et al. found similarity across teachers with the same set of students was stronger than similarity for different groups of students who have the same teacher. The makeup of students within each classroom may be linked to different instructional practices teachers implement to address the needs of a particular group of adolescents.

Evidence for this first hypothesis was further strengthened by the partial confirmation of our third hypothesis, that descriptive norms were a stronger predictor of individual change in perceptions than status norms when examined jointly. Our approach to modeling each peer norm in distinct models and simultaneously while comparing changes in model fit and effects size bolsters evidence in support of our first hypothesis of the strength of descriptive norms as a predictor of individual perceptions. We also rule out collinearity and can better reject our second hypothesis of the role of status norms on individual perceptions. Namely, this approach addresses concerns about multi-collinearity in that descriptive norms could mask the effects of status norms. From

modeling each separately and together, our study design provides evidence that descriptive norms are the driving classroom peer norms linked with individual perceptions of autonomy-supportive teaching practices.

Status norms did not predict any autonomy-supportive practices. While social learning theory suggests that peers with power may be particularly influential (Bandura, 1986), peer influence did not matter for perceptions of teaching practices. While Laninga-Wijen et al. (2018) found evidence for the effects of behavioral status norms on individual students' behaviors, we found this was not the case for status norms of student perceptions. Nonetheless, their study discussed the extent to which the status norms lend themselves to being influenced by other classroom factors, such as the existence of a hierarchy within a classroom. There is more hierarchy, or importance of status, for students in some classrooms than in others. Our study did not assess whether or not students care about being cool or students' social goals. We see the standard error for status norms is high, which may be linked to the fact that we were not accounting for the status salience of a classroom in addition to the status norms. McKellar et al. (in press) found that classrooms with descriptive norms for perceived mastery goals had more students overall being nominated as having status or being "really cool." As a result, status did not predict any specific behaviors in these classrooms. Moreover, there is no evidence that perceptions of peers with status hold more weight in how classmates perceive the context.

The present analyses, taken together with prior research, highlight the potential for other classroom practices, namely teacher social management dynamics, to affect hierarchy within a classroom. Our findings also support the predominant approaches to

aggregating individual perceptions as an indicator of the climate. If descriptive norms were not a predictor of spring student perceptions above and beyond fall individual changes, we would conclude that idiosyncratic perceptions of the classroom shape how students perceive teaching practices. However, this was not the case, as descriptive norms predicted spring perceptions when accounting for fall perceptions.

Lastly, we found that student demographic characteristics played little role in how student perceptions change from the fall to the spring, except for Black students perceiving greater disciplinary harshness and Asian students perceiving greater voice and choice and relevant instruction. Our sample only included 6% Asian students, and we were cautious about interpreting these findings in light of a small sample. Sanders and Wiseman (1990) found that Black, White, and Latinx affective learning was linked to teachers encouraging students to talk and teachers' use of inclusive referents such as "our class" or "we"—indicators of autonomy-supportive practices— but this was not the case for Asian students. More work is needed to better understand Asian students' experiences of teaching practices.

According to our findings, Black students are experiencing greater harshness in their classroom context than their peers. These demographic findings support the extent to which student perceptions of autonomy-supportive practices and peer norms may be linked to school and classroom racial climate (Byrd, 2017; Hope, Skoog, & Jagers, 2015). Beyond evidence of how schools and teachers respond to student behavior differential based on student race (Kinsler, 2011), lack of school trust is more common among Black students than peers belonging to other racial groups (Bottiani, Bradshaw, & Mendelson, 2016; 2017; Gregory, Cornell, & Fan, 2011). Amemiya, Fine, and Wang's (2019) multi-

method daily diary study assessed students' teacher and school trust in relation to observed teacher acts of discipline and subsequent student-reported engagement. For students with high teacher trust but low institutional trust, teacher discipline lowered subsequent engagement. But both high teacher and school trust were related to increased engagement after the teacher disciplines the student. These findings offer support for institutional interventions rather than only teacher-targeted interactional interventions to address the extent to which Black students experience greater disciplinary harshness than their peers. Banks (2014) asserts that individuals' experiences cannot be disentangled from systemic racism and the socio-historical context in which policies and acceptable behavioral norms are driven by White norms (Banks, 2014). If we are to support teachers with creating more autonomy-supportive and less autonomy-controlling context for all students, institutional reforms are needed (Kinsler, 2011).

Limitations and Future Directions

Overall, a limitation of this study was that we assessed student perceptions of classroom practices a few weeks after the school year had begun. Students often form their perceptions of teaching practices earlier in the year. Thus, the relationships between teachers, student perceptions of teaching practices, and peer relations would probably be better understood if these were explored earlier. Popular peers might have already shaped their classmates' perceptions prior to our data collection.

Another limitation of our study was our examination of status norms based on one indicator of status: peers considered "really cool." Prior work on status suggests that there is more than one kind of classroom reputation. It might be beneficial to examine peers who are considered popular, who are well-liked, and those who have positive academic

reputations, among other status indicators. Students may emulate different peer behaviors for distinct reasons, and research investigating different kinds of status norms could lead to better understand about the influence of peers.

Moreover, the scope of this study limited our ability to explore different individual- and classroom-level characteristics that could be related to peer dynamics. Specifically, students' social goals may play a role in whether they are influenced by status norms. For example, students' concerns about performing well are linked to students' concerns about whether they care about status, looking cool, or being accepted. These concerns are part of students' social goals (Makara & Madjar, 2015). Students' social goals predict students' academic and social adjustment during middle school (Shim & Finch, 2014). Suppose students do not care about being cool. In that case, their perceptions may be oriented more towards their individual relationship with the teacher or shaped by how students overall feel about the teacher.

Lastly, we were unable to assess teacher social management dynamics or the extent to which teachers shape peer dynamics alongside peer norms in the present study. Teaching practices and peer norms support student engagement and academic outcomes (Vollet et al., 2017). Our study was limited by not investigating the classroom peer norms for several groups of students with the same teacher, and we would need to use similar approaches to Fauth et al. (2014).

Despite these limitations, our study included several strengths. First, we used peer nomination as a data source and applied multilevel analyses. This approach enabled us to understand peer norms in relation to perceptions of classroom climate, specifically teaching practices. We also examined perceptions and norms in the fall and spring to

assess the impact of peer norms in the fall on changes in student perceptions across the school year. Lastly, this study draws upon measures and frameworks employed in both the classroom climate and peer dynamics literature to understand more about the classroom ecology and the extent to which peer and teacher factors are linked.

Conclusion

This study supports our understanding of how individual student perceptions are influenced by descriptive norms and suggests that there is little additional relevance for status norms once descriptive norms are considered. With the growing interest in understanding influential peers, this work also contributes to how we might apply the peer norms literature to the assessment of classroom climate, and vice versa. This work is important in supporting teachers' understanding of the limitations that peer hierarchies play in student perceptions; the perceptions of popular or cool students do not predict classmates' perceptions of autonomy-supportive climate. This study may aid in alleviating some worries of novice teachers, as they often have concerns about being "liked" by their students and managing classroom behavior in response to disruptive and defiant students (Arbuckle & Little, 2004; Fuller, 1969; Jones & Vesilind, 1995; Houghton et al. 1988; Martin, Chiodo, & Chang, 2001). Namely, our study provides evidence that popular students' beliefs are not more influential than others in the class. Overall, the findings from this work can be incorporated into current social management dynamics studies. By understanding student perceptions of teaching practices as a classroom descriptive norm, we can understand how it is important for teachers to attune to the average perceptions of students to understand how to get more students to feel that their autonomy is supported.

Chapter 7: Conclusion

Early adolescents spend the majority of their time in classrooms surrounded by their peers. During this stage of development, parent and teacher influence is often diminished as students' friends, popular students, and group norms garner more weight for adolescents. As students begin to look more towards their peers to navigate their school classroom behaviors and beliefs (Ryan & Patrick, 2001; Eccles, Lord & Midgley, 1991), questions arise as to the nature and scope of peer influence in shaping how they view and act in an academic context. While linkages between peer relationships and academic adjustment have been established (Ryan, 2000), my dissertation aimed to understand the underlying processes of how peer dynamics are related to student experience in the classroom (Rodkin & Ryan, 2012). Namely, the goal of this dissertation was to employ three different approaches (peer groups, friendship networks, and classroom peer norms) to understand the reach of peers on how students experience autonomy-supportive teaching practices.

When examining findings across all students, my dissertation supports that student perceptions of autonomy-supportive practice are driven by individual and teacher characteristics, rather than by influential peers. While our studies offered little support that peers are influential to how students experience teaching practices, understanding patterns of peer perceptions provides an important way to understand more about classroom processes.

While peers are not influential for classmates' perceptions of teacher autonomy-support, our findings support that peer perceptions are related to one another for some aspects of autonomy-supportive teaching (i.e., disciplinary harshness) and not for others (i.e., fostering relevance). Classroom and peer researchers can attune to student perceptions of disciplinary harshness as something that is linked to differences in friend groups, how students choose their friends and descriptive norms in the classroom. Given links between different ways in which peer behaviors and beliefs predict student outcomes, the initial formation for friendships with common perceptions of disciplinary harshness may shed light on peer-group formation that sets the stage for how peers may be influential in other ways. From this work, I plan to investigate these practices earlier in the school year. It would be especially interesting to investigate the evolution of student perceptions from the first day of school alongside the evolution of friendships with methods looking at multiple classrooms of students who have the same teacher such as Fauth et al.'s (2019) work or Amemiya et al.'s (2019) daily diary approaches.

Furthermore, there do not seem to be gender climates, as boys and girls largely view classrooms in similar ways, and friendship processes linked to perceptions of the classroom do not differ by gender. Based on our findings, school and classroom racial climate play a role in how students experience their classroom and peer contexts (Byrd, 2017), namely Black students' differential experience of discipline relative to peers of other racial groups (Bottiani et al. 2011; Kinsler et al. 2017).

Most importantly, the findings of this study highlight that there do not appear to be subclimates of experience in the classroom that are not explained by individual characteristics (i.e., student race) or classroom characteristics (i.e., Emotional Support, or

descriptive norms of autonomy-support). Teachers who create motivating climates engage in practices that recognize students' thoughts and feelings by providing students with meaningful choices and fostering students' interest in the material (Deci, Eghrari, Patrick, & Leone, 1994; Mageau & Vallerand, 2003). These teachers support students' autonomy. Autonomy-supportive teaching practices emerge out of interactions between teachers and students, and there is no evidence that these are amenable to peer influence.

Moreover, our findings suggest that teachers are more likely to shape peer interactions than the opposite occurring. As novice teachers are preoccupied with concerns about classroom disruption and fear of being disliked (Arbuckle & Little, 2004; Fuller, 1969; Jones & Vesilind, 1995; Houghton et al. 1988; Martin Chiodo, & Chang, 2001), these findings may offer reassurance. For example, rather than attempts to leverage the influence of popular students in the classroom, teachers can focus more on the average student experience (descriptive norms) at the start of the year because descriptive norms are the most promising norms for shaping student perceptions. While teachers have lower self-efficacy in managing peer relations than other teaching practices (Ryan et al., 2015), this study offers support to the idea that social management dynamics are linked with established practices. Because we know that students' friends or popular students casting a negative lens on the classroom is unlikely, teachers can direct energy towards social management strategies that are suggested in other studies (see Farmer et al. 2018; Shin & Ryan, 2017), along with avoiding disciplinary harshness and providing emotional support through positive teacher-student interactions (e.g., those indicated by the CLASS).

Appendices

Appendix A

Student Perceptions of Autonomy-Supportive Teaching Practices Items

Teacher Disciplinary Harshness (α=.79)

In this class:

My teacher is very strict.

Students get in trouble for breaking small rules.

It is easy for a student to get kicked out of class.

The rules are too strict.

The rules are fair. *(reversed)*

Teacher Promoting Voice and Choice (α=.76)

In this class:

Students have a say in how things work.

Students help decide how class time is spent.

Students are given the chance to make decisions.

Students get to help to decide some of the rules.

Teachers ask students what they want to learn about.

Teacher Fostering Relevance (α=.80)

During (math/science), my teacher:

thinks it is important that we learn things that interest us

explains why it is important to study (math/science).

talks to us about our ideas about (math/science).

talks about the connection between what we study in (math/science) and what happens in real life.

Appendix B

Student Engagement Items

Disruptive Behavior (α=.75)

I get into trouble in my (math/science) class.

I behave in a way that annoys my (math/science) teacher.

I don't follow my (math/science) teachers' directions.

I always follow the classroom rules in (math/science) class. *(reversed)*

Emotional Engagement (α=.89)

My (math/science) class is fun. 10A

I enjoy learning new things in my (math/science) class. 10B

When we work on something in (math/science) class, I feel interested. 10C

When I am in (math/science) class, I feel good. 10D

Behavioral Engagement (α=.86)

I pay attention in my (math/science) class.

When I'm in (math/science) class, I participate in class discussions.

When I am in (math/science) class, I listen very carefully.

I try hard to do well in (math/science) class.

When we work on something in (math/science) class, I get involved.

In my (math/science) class, I work as hard as I can.

Appendix C

Peer Nomination Items

Peer Nominations of Classroom Friends*

Who are your friends in this class? Who do you talk to and hang around with the most?

Peer Nominations of Status (Note all nomination items of included for context)*

All students act differently in school. Which students in your class…

get good grades

do not get good grades

follow school rules

do not follow school rules (get in trouble)

are really cooperative and willing to help others

are really cool

*Students check from roster/class list for each item

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